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TIERRA ENGINEERING CONSULTANTS, INC.

CIVIL AND SOILS ENGINEERING
LAND SURVEYS AND DEVELOPMENTS

CONSTRUCTION FOUNDATION REPORT

FOR SEEPAGE CONTROL ADITS

ABIQUIU DAM AND RESERVOIR, NEW MEXICO

FEBRUARY 2, 1990

PREPARED FOR:

U.S. Army Corps of Engineers
Albuquerque District
P.O. Box 1580
Albuquerque, New Mexico 87103

PREPARED BY:

Tierra Engineering Consultants, Inc.
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Santa Fe, New Mexico 87501

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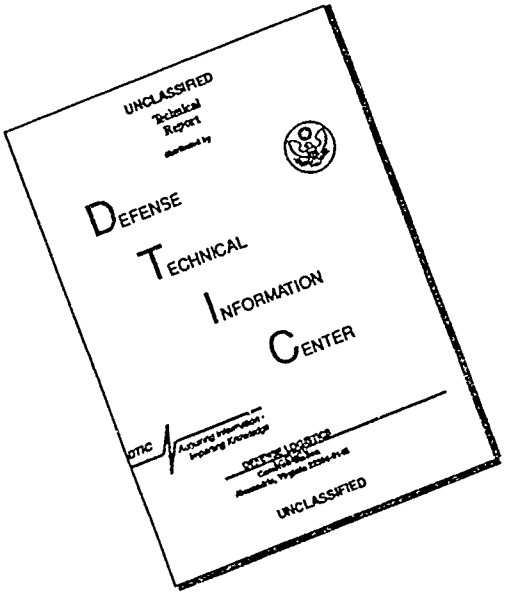

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Abiquiu Dam was completed in February 1963. The spillway was modified and the embankment was raised in 1986. The project now consists of a 1,800-foot-long, 340-foot-high rolled earth filled dam with a 68-foot-wide uncontrolled spillway located 4,000 feet north of the left abutment. Seepage through the abutments has been a problem since shortly after project completion. Supplemental grouting programs in 1966, 1978, and 1980; and drainholes drilled in 1966, 1977, 1979, and 1980 failed to provide adequate control of the seepage. The adits were constructed to capture and provide controlled drainage of this seepage.

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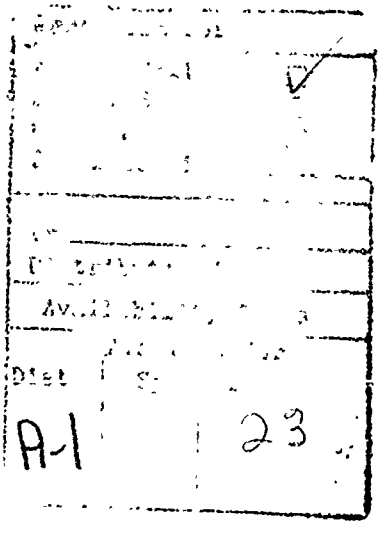

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I. INTRODUCTION

I-01. Location and Project Description - Presented herein is the Foundation Report for the Construction of Seepage Control Adits for Abiquiu Dam and Reservoir. The adits were constructed to capture and provide controlled drainage of reservoir seepage which had been emerging on the downstream abutments.

The site of the Abiquiu Dam and Reservoir project is about 35 miles northwest of Espanola, New Mexico, on the Chama River at river mile 33. The project consists of one seepage control adit and a secondary drift in each abutment of the dam. Adit and drift number one (1), on the left (north) abutment total approximately 1,250 feet in length. Adit and drift number two (2), on the right (south) abutment total approximately 1,000 feet in length. Radial lines of drill holes ranging in depth between 20 feet and 214 feet were drilled from the adits on approximately 20-foot centers in both adits to provide additional drainage.

I-02. Construction Authority - Corps of Engineers, Albuquerque District

I-03. Report Purpose - The purpose of this report is to present a detailed geological investigation of the foundation and overburden materials and conditions encountered during construction of the adits.

I-04. Project History - Abiquiu Dam and Reservoir Project was authorized by the 1948 and 1950 Flood Control Act for the purpose of flood control and sediment detention. Construction of the embankment and spillway began in March 1959 and was completed in February 1963. The project consists of the following principal features: a rolled earth fill dam, controlled outlet works, an uncontrolled spillway located 4000 feet north of the left abutment, a maintenance building, service roads, an operations building and public use facilities. The project was modified to comply with the requirements of the Dam Safety Assurance Program. An embankment raise and spillway modification were required to provide adequate freeboard and to safely pass the revised probable maximum flood. Additional downstream toe protection on the dam was provided due to the increased discharge and higher tailwater elevations. As the result of the embankment raise and spillway modification, the dam crest length was increased from 1,540 feet to 1,800 feet, the maximum height above the stream bed changed from approximately 325 feet to 340 feet, and the spillway was widened by 28 feet to a total width of 68 feet. Due to the required embankment raise, the dam crest road was removed and then replaced upon completion of the embankment raise. Construction of the road was completed on August 30, 1986. [1]

Supplemental drilling and grouting programs were conducted during 1966 in an attempt to reduce seepage around the control shaft and through the left abutment. Sixteen (16) holes were drilled around the control shaft to an elevation of 6,115. A total of 4,480 linear feet of holes were drilled and grouted, and 2,317 cubic feet of cement was placed. Seepage into the control shaft was almost eliminated by the program. A 560 foot section of foundation was regrouted from station 3+90A to 9+50A and a 500 foot section of grout curtain was added on the left abutment. [1]

[ ] Refers to Appendix 1, List of References

I-04.1 Grouting - From late 1978 until late 1980, 2 additional grouting programs were completed. Under the first contract, 510 feet of foundation grout curtain was regrouted from station 14+70A to 19+80A. The curtain was then continued up the right abutment 500 feet. Under the second contract, the 1966 increment was extended 500 feet on the left abutment, and 500 feet of the curtain was extended on the right abutment. [1]

I-04.2 Piezometers - Fourteen (14) piezometers were drilled as a modification to the grouting contract of 1966. In 1977, twenty-two (22) additional piezometers were drilled on the right and left abutments and the downstream side of the dam. In 1986, five (5) piezometers were drilled on the right abutment, one (1) in the embankment and four (4) on the left abutment. Fifteen (15) embankment piezometers were also drilled in the downstream horizontal drainage blanket and stream alluvium and four (4) in the downstream random fill zone of the embankment. (See Plate 2, Appendix 10 for piezometer locations.) [3]

I-04.3 Drainholes - In 1966, the first series of drainholes were drilled in the left abutment which consisted of twelve (12) holes. Twelve (12) additional holes were drilled in the right abutment in 1977. During 1979, four (4) holes were added to the left abutment and five (5) on the right abutment. In 1980, three (3) holes were added on the left abutment and four (4) holes to the right abutment. (See Plate 2, Appendix 10 for locations.) [3]

I-05. Location of Structures - Structures discussed in this report are Portals, Adits and Drifts. Locations are shown on Plate 2, Appendix 10. [3]

I-06. Contractors - Excavation of portals, adits and drifts along with portal construction was completed by Elmore Pipe Jacking. Drainhole drilling and drainpipe installation was completed by Continental Drilling. Both companies are based in California. Electrical and surveying services were contracted through local businesses. Surveying services were provided by Ray Ortiz Surveying from Santa Fe and electrical services by Zia Electric from Abiquiu.

I-07. Supervision - Supervision of all activities including excavation of portals, adits and drifts along with installation of portal structures, shotcreting, rockbolting and all drilling activities was carried out within each contracting company. Corps of Engineers provided overall inspection.

I-08. Quality Control Organization - Contractors established and maintained quality control throughout the project with the use of the following tools or tests:

- Use of a laser to give correct lines of excavation and grade for adits and drifts.
- Cores of tunnel walls taken to obtain shotcrete thickness and strength.
- Pull tests performed to obtain rockbolt strengths.
- Drilled pilot holes after shotcrete installation to check thickness.
- Directional surveys taken of all inclined drainholes and 10% of all vertical drainholes to check if target area was hit.

Corps of Engineers inspected and maintained the Contractor's quality control programs by sampling and testing to confirm results. Data was not provided for this report.

I-09. Design Staff - Design for the seepage control adits at Abiquiu Dam was done by Tierra Engineering Consultants. Design staff includes the following:

Richard B. Catanach	Project Engineer
Alan J. O'Neill	Consultant - Geology and Tunneling
Dr. Greg Korbin	Consultant - Rock Support Systems

II. FIELD INVESTIGATION

II-01. Summary and Description - Geologic field mapping of the portals, adits and drifts was carried out using peripheral geologic mapping techniques in order to log all geologic features present regardless of their positions on the tunnel walls. All materials encountered along with overburden materials were classified and described in accordance with Table B-2 of Corps of Engineers Manual EM1110-1-1804, "Geotechnical Investigations", dated 29 February 1984. Geologic maps were also prepared for the north and south portal faces. All pertinent features such as fractures, joints, bedding planes, seeps and faults were included in the maps. Mapping is presented as Appendix 7.

A detailed log was kept for each drain hole drilled. Samples were taken and analyzed to provide a detailed description of the lithology and to assist with the proper positioning of perforated PVC drainpipe. Logs are presented as Appendix 11.

III. PREVIOUS EXPLORATIONS

III-01. Explorations and Results - Previous explorations at Abiquiu Dam include borehole drilling and a seismicity study of the area. Both programs provided data to determine rock properties for tunneling methods, rock support and stability of the adit project.

III-01.1 Subsurface Exploration - Subsurface exploration along the proposed alignment of the adits was completed on October 10, 1987. This program consisted of nine (9) vertical and two (2) angle borings along with additional testing to determine rock properties including compressive strength, density, and swell pressure. Refer to Appendix No. 2 for test results.

III-01.2 Seismicity Study - A detailed seismological study was completed for Abiquiu Dam and Reservoir on June 6, 1986. The study concluded that the most severe earthquake at the site would be a magnitude 7 event. It was concluded that if such an event were to take place at Abiquiu Dam, the adits and drifts would not be prone to earthquake damage due to their location away from direct contact with major faults. [2]

IV. GEOLOGY

IV-01. Regional Geology - The canyon containing Abiquiu Dam was cut by the Rio Chama into the shales and sandstones of the Permian Abo formation and the lower sandstone of the Triassic Chinle formation. Both of these rock units are relatively flat lying and highly fractured. They extend throughout the southeastern Chama Basin. The Chama basin is an elongated, north plunging depression bounded on the west by the Gallina - Archuleta arch (San Pedro Mountains), on the northeast by the Brazos uplift and on the north and south by the San Juan and Jemez volcanics respectively. The Chama syncline is also present and here trends approximately north-south and is located in the center of the basin.

On the east, within 1.5 miles of the dam, the Chama basin is bounded by the Espanola Basin which is one of the major basins of the Rio Grande Rift; a structural feature that extends the length of New Mexico. This boundary is marked by northeast trending, high angle normal faulting. The sedimentary rocks present within the basin range in age from Pennsylvanian to Pliocene. Igneous rocks of the basin are divided into the Pre-Cambrian intrusives of the San Pedro Mountains in the west and the Pliocene and Pleistocene extrusives of the Jemez Mountains in the south. The southeastern part of the basin is characterized by broad folds and gentle regional dips to the north and west. Steeply dipping normal faults with a general north to northeast trend are common and often exhibit throws in excess of 200 feet. Jointing is generally north-west to north-east and are nearly vertical to vertical. [1]

The close of the Cretaceous Period culminated in wide spread crustal movements that have caused a mosaic of fault blocks, erosion and peneplanation, and deposition of approximately 2,000 feet of sediment. Additional deformational crustal adjustments near the close of the Tertiary Period uplifted and faulted the region, outlining the broader features of the present day topography. Quaternary time brought long periods of erosion interrupted by volcanism. Successive piedmonts and broad valleys were incised, and dissected, leading finaily to the modern floodplains, especially in the reservoir area. [1]

IV-02. Site Geology - Overall site geology was presented in Design Memorandum No. 4, "Geology, Soils and Construction Material", dated October 1955. Results were supplemented by additional core holes along or near tunnel adits and additional testing to determine rock properties for tunneling methods and rock supports.

A review of the abutment rocks and leakage conditions indicates that the more indurated, more competent stratum within a formation shows more intense deformation joints, while the more plastic, more yielding portions show poorly developed, or no jointing. Numerous vertical or high inclined joint planes are usually confined to individual stratum and stop at bedding planes or are there offset and continue downward to one side or another. [1]

Before this project was undertaken an increasing number of rock slides and bank failures both in the reservoir area and downstream of dam had occurred. The abutments of the dam and the canyon walls downstream of the dam experienced wide spread wetting from abutment seepage. Several problems occurred as a result of this. [1]

- Controlling, routing and measuring the seepage was an increasing problem.
- The wide spread wetting of the mudstone layers along the abutments and downstream of the dam caused stability problems resulting in numerous rock slides.

IV-03. Lithology - Permian and Triassic age rocks are exposed at the dam site. Permian age rocks belong to the Abo formation which is up to 1,500 feet thick and varies in composition with depth. The upper section is a massive, red to dark brown mudstone with irregular lenses and masses of green sandy mudstone and clay. The lower section of the formation is a series of interfingering lenses of silty mudstone and silty sandstone. The dominant color is red to brown, but some units are purple to green. Individual beds vary horizontally in both thickness and composition. The sandstones are extensively jointed and the mudstones display numerous minor joints. Joints faces in the mudstone are commonly striated and slickensided in random orientations. [1]

The Agua Zarca Sandstone member of the Triassic Chinle Formation overlies the Abo formation. Above the Agua Zarca Sandstone are the Salitral Shale Tongue and Poleo Sandstone members of the Chinle Formation, which extends up to the rim of the canyon. The Agua Zarca Sandstone is dominantly white to buff colored, medium to coarse grained, quartzitic, well cemented and highly jointed. Locally there are thin seams and zones of conglomerate with cobbles up to 4 inches in diameter. All sand and gravel size material is well rounded. Reddish-brown mudstone occurs as irregular lenses and seams. [1]

IV-04. Ground Water - Recent analysis of the regional groundwater indicates that prior to construction of the reservoir, the Rio Chama was an influent stream. Now that the reservoir is in place it serves as a source of water for flows downstream of the dam which are combined with groundwater flows in the downstream area. For most of the reservoir, the higher base level would result in a relatively slight lowering of gradient from the recharge zones to the valley; and a slight increase of the down-valley gradient. These changes would result in minimal change to the regional flow net; the direction of groundwater flow would remain nearly perpendicular to the valley. In this condition the reservoir would be a zone of groundwater discharge, as was the river before it, not a source of seepage. The exception to this outcome would occur near the dam site itself, where the down-valley flow does not encourage seepage to occur from the reservoir. It would be expected that this water would be discharged to the alluvium below the dam, within to 1 to 1.5 miles with the major portion occurring near the dam site. [1]

IV-05. Rock Engineering Characteristics - Overburden and subsurface rock characteristics were obtained from the drilling project of 1987. Cores were taken and tested for rock strength, density, and swell pressure. The test results are presented in Appendix 2.

IV-06. Construction Conditions - Rock conditions overall were very favorable. The sandstone which the adits were driven into was moderately hard to hard and moderately to highly fractured. Although the sandstone was highly fractured in areas, steel sets were not necessary for wall support due to the strength of the sandstone and the orientation of the joints. Rockbolts and shotcrete were all that was necessary to support the tunnel walls. Loose rock was found in several areas where joints did intersect. All such loose material was anchored with rockbolts or knocked out entirely. See photographs, Appendix 9.

A 3 foot thick section of a well cemented sandstone was encountered in the South Drift between stations 0+62 and 1+25. This area was extremely hard and required several changes of teeth on the roadheader to enable excavation to be completed. Samples were taken and tested by the Corps of Engineers. Test results indicated compressive strengths between 25,000 - 30,000 psi.

Faulting was very moderate. Very few areas showed any sign of faulting. Where faulting was present, displacement ranged from 1 inch up to a maximum of 6 inches. Water seepage was not always present within these faults but when it was, amounts were relatively high. Seepage flows versus lake levels are presented in Appendix 3. Typical faulting is shown in photographs, Appendix 9, and mapping is presented as Appendix 7.

Both adits were started with their inverts in mudstone. The mudstone was stable with only minor sluffing and caused no difficulties in adit construction.

The majority of water intercepted by the adits flowed down the joints and out either at the sandstone/mudstone contact or at or near the contact between the tunnel wall and the invert. Very little water seepage was encountered along the crown or tunnel ceiling. As the tunnels were advanced seepage also advanced leaving previously wet areas dry. Seepage waters were minor and caused no difficulties in adit construction. Some of the seepage waters were collected and used in the excavation and drilling operations.

V. SPECIAL DESIGN CONSIDERATIONS

V-01. Portal structures were extended 14 feet out from the portal faces at each of the two adit entrances. The structures were constructed using steel rigid frames enveloped in concrete and blanketed with rock fill to protect the portals against damage from falling rock A phasing schedule with specified portal configurations was prepared and included in the contract documents. The portal specified for adit construction was not built until adit excavation was complete. During adit excavation a steel framed structure with wood planking was used for portal protection. See photograph Appendix 9. The structure was approved by Corps personnel to avoid losing excavation time building the permanent structure and to also avoid possible damage to the permanent structure during excavation. Refer to Plans and Specifications [3] and plate 14, Appendix 10, for dimensions and configurations and refer to photos, Appendix 9 for as-built photographs.

VI. ADIT CONSTRUCTION

VI-01. Overburden Excavation - Benches above each portal face were excavated to initiate construction. The bench on the North Portal was specified to limit the depth of exposed rock face had line drilling been used. The bench at the South Portal was excavated by the Contractor for his convenience. After excavation of the adit portals to invert elevation, chain link fabric along with shotcrete were applied to each portal face to protect and preserve the rock. No other overburden excavation was required. Refer to Appendix 9 for photographs.

VI-02. Excavation Procedures and Equipment - The north and south portal faces and benches were excavated using a backhoe mounted rock hammer. The plane of excavation for both portal faces was approximately 2 vertical:1 horizontal (60° from horizontal). Once the excavation was completed. chain link fabric held with 6 foot rockbolts was installed on the portal faces followed by a 2 inch cover of shotcrete to insure portal face stability. Once the shotcrete had cured, tunnel excavation proceeded. [3]

VI-03. Adit Excavation - Excavation of the adits, drifts and portals was accomplished using a fully articulated boom excavating machine, commonly known as a "roadheader". Two such machines were used throughout the length of the excavation work. The first roadheader put into operation was an Alpine Miner, Model AEC-250, H Series. It was used exclusively from June 1, 1989 to July 25, 1989. On July 25, 1989, a larger roadheader arrived on site and was put into operation on July 27, 1989. The new roadheader was a Dosco, Model SL 120. It replaced the Alpine Miner while it was down for repairs. On August 12, 1989, the Alpine Miner was repaired and put into operation along with the Dosco. Both roadheaders were used for the remainder of the excavation work. Other machinery used in the excavation of the portals, adits and drifts included two SF 342 Muckers, 1 John Deere 210 C Loader, 1 Caterpillar 950 E Loader, 1 Toyota Skip Loader, 1 Caterpillar 8356 Backhoe and 1 Semi-Truck. A batch plant was also used for preparing shotcrete as required by the plans. Refer to Appendix 9 for photographs.

Excavation began with the south portal on June 1, 1989 and ended in the North Adit on October 20, 1989. (Refer to maps for chronological record.) A total of 2,250 feet was excavated in 103 actual working days for an overall average of 22 feet per day.

Several days were lost completely or shortened due to mechanical breakdowns. A single ten-hour excavation shift followed by a ten-hour support shift was scheduled each day until August 17, 1989. At that time a double shift begin which consisted of two, ten-hour excavation shifts and two, ten-hour support shifts. Each shift excavated one tunnel while supporting another. A total of 130 excavation shifts were completed which averaged approximately 17 feet of advance per shift.

In order to excavate the tunnel to grade and within reference lines, a laser was set up at a known station and elevation. The laser, along with the use of a measuring rod, gave such direction. Although steel sets were on site, conditions did not warrant their use. Therefore, overexcavating for their installation was not necessary. Refer to Plans and Specifications, [3] and plate 11, Appendix 10 for typical adit sections.

Excavation of the north and south adits and drifts alternated depending on the working roadheader's availability and down time for settlement pond relining. The following dates are associated with the excavation of each tunnel:

1)	South Adit	June 25 - July 20 August 23 - September 13
2)	South Drift	July 17 - July 25 August 22 - September 6
3)	North Adit	July 26 - August 19 September 9, September 18 - October 2
4)	North Drift	August 3 - August 19 September 11 - September 16

Procedures for excavation and support of each tunnel were as follows: As the roadheader excavated and advanced forward, all pulverized material was carried back into a mucker via a conveyor belt. It was then removed from the adit and taken to the waste area. Throughout each excavation shift, reference lines were checked using a measuring rod and the laser. At the end of each shift, prior to pulling the roadheader out, the reference lines and grade were again checked.

Any deviation from design plans was corrected at this time. A positive grade of 1%, as required for drainage, was excavated throughout both adits and drifts. Once the roadheader was pulled out of the newly excavated area, the area could then be supported. Support included installation of 6-foot rockbolts and a 2-inch application of shotcrete. Rockbolt holes were first drilled using hydraulic drills. Quick and slow set resins (3-6-inch tubes of each) were then installed in the hole followed by the rockbolt. A plate and nut were then installed on the end of the rockbolt and tightened with a pneumatic torque wrench. Rockbolts were installed in rows spaced 4 feet apart with alternating 6-and 5-bolt patterns. Weep holes were drilled to divert water away from the tunnel walls to provide a dry surface for the shotcrete bond. Shotcrete was applied from the crown down to the invert of the tunnel. Although gauging pins to insure shotcrete thickness were specified the contractor relied on past placement coring to test shotcrete thickness and use of rock bolts. A 2-inch thickness was specified. At the beginning of the project, shotcrete was also applied to the invert, a modification of the specified structural concrete mud sill. This practice was abandoned due to the weight of the machinery breaking up the invert and rendering it useless. After this practice was abandoned, gravel was used to protect any exposed mudstone in the invert and to assist in traction for the machinery. After each tunnel was completed, the gravel invert was removed to a depth deep enough to expose fresh rock. This process was completed in sections small enough to be covered with concrete within the maximum exposure time for the mudstone. To avoid water contact with the freshly exposed rock surface, dams and pumps were set up to divert water away from the exposed area. This step formed the sub-invert necessary for protection of the invert during the drilling program. Once the drilling was completed a finished invert with water channels was installed.

VI-04. Dewatering Provisions - Before adit excavation work could begin, the construction of settlement ponds had to be completed. Three ponds on each side of the canyon floor were excavated and lined. The ponds were designed to capture all water exiting the adits in order to settle out any particulates before discharging it into the river. The ponds were necessary to comply with State and Federal clean water regulations. On the south side, problems arose immediately after the ponds were filled. Water began to seep out of the ponds creating sluffing of bank material and the formation of settlement fissures on the road adjacent to the ponds. After much consideration, the ponds were pumped out, cleaned and relined. This, along with regular mucking out, provided an adequate volume for particulates to settle out and eliminated further problems. See photographs, Appendix 9 for pond locations.

Water discharge from the adits was as follows: On the north side discharge was 540 gallons/min. after the adit was completed and remained at 540 gallons/minute after the drainholes were installed. On the south side discharge was 300 gallons/min. after the adit construction and 310 gallons/min. after the drainholes were installed. Significant increases were not anticipated in either adit, as the reservoir is quite low. For further information on water discharge and pool elevation see Appendix 3.

VI-05. Problems Encountered - Very few problems were encountered during the excavation of the portals and adits. The contractor had difficulty maintaining shotcrete adherence especially on wet mudstone and other areas of wet rock. After the final floor was poured, all areas were re-shotcreted and the shotcrete held. The only other construction problem was a hard digging area, which was

referred to in paragraph IV-06. All other problems were mechanical in origin. The conveyor belt assembly along with the gear box on the roadheaders were a source of continual breakdowns and delays. The alpine conveyor system would often bind up and shear roller pins when it became buried in muck, especially where the invert was in mudstone.

VI-06. Drainhole Drilling - The drainhole drilling program began October 5, 1989 and ended January 19, 1990. Two hundred and ninety-seven (297) drainholes were drilled which included 111 vertical upholes, 111 vertical downholes and 75 inclined holes. Vertical upholes were installed 20 feet apart, slightly off center to leave room for ventilation lines. Vertical downholes were installed at 20 foot centers. Approximately 24,000 feet were drilled in 88 days for an average of 273 feet per day. Several days were completely lost or shortened due to mechanical breakdowns. Design drawings showing drainhole locations are presented in Appendix 10. One drain hole in the south adit at station 5+21 day lighted due to length of hole taken from adit wall instead of center of adit.

The work effort began with one drilling rig in the South Drift on October 5, 1989. It was used for about a week before the work effort was expanded to include four working rigs per shift and two shifts per day. The drilling rigs used were all air driven rotary drills. The following is a list of all rigs used in the drilling project: 2 Stanwicks, 1 Dodge, 1 CP65 and 2 Ingersol Rands. For a chronological record of the drilling program refer to Appendix 5.

No problems were encountered while drilling the drainholes in the South Adit and Drift. In the North Adit and Drift, a hard section of white, medium to coarse grained, well cemented sandstone was encountered. This section was approximately 12 feet thick and was located between elevations 6217 to 6229 feet. Drilling in this area was very slow, averaging 2.5 hours per 5 foot rod compared to 30 to 45 minutes per 5 foot rod in the slowest sections outside of this area. A core was taken by the drilling Contractor, however, test results were not made available. The only other source of problems in drilling the drainholes in the north and south areas were mechanical breakdowns. The drilling subcontractor had to return to the site after demobilizing the complete some holes in the north adit that were not drilled to depth specified.

Procedures for drainhole installation are as follows: Drainholes were drilled to required lengths using an NX size bit and water as the drilling fluid. Drainholes were surveyed using a directional surveying tool. All inclined holes were surveyed every 20 feet and 10% of vertical holes were surveyed at the start, halfway, and the end to check if the target area was hit. All holes surveyed achieved target. If water discharge was encountered, a flow test was run and results were recorded. Once the drainhole was completely drilled out PVC pipe was installed to drain off areas of seepage and potential areas of seepage (sandstone) and to block off mudstone areas. Perforated PVC pipe was installed where drainage was anticipated and solid PVC pipe with packers in the non-seepage areas. The exposed PVC pipe at the tunnel wall was then grouted in place. Refer to Appendix 9 for photos.

Overall observations of the drilling project are as follows:

- The lower sandstone formation, which each adit was driven into, drilled relatively fast.

- The mudstone formation separating the lower and upper sandstone along with the underlying mudstone formation drilled very slow. This was due mainly to the inability of the water to be directed to the tip of the cutting bit in order to clean out the hole as the bit was advanced. As the project progressed different bits were used which reduced this problem.

- The upper sandstone formation drilled moderately fast however it drilled slower than the lower sandstone due to the fine grain size and presence of mudstone.

- Most downholes (inclined and vertical) contained some amount of water discharge. It varied from 5 gallons/minute down to a trickle.

- On the south side the majority of upholes were dry. Where water did exist it varied from a few pints/minute down to a trickle. On the north side, the majority of upholes contained water varying from a couple of pints/minute down to a trickle.

- Some initial discharges were up to 10 gallons/minute before leveling off to a few pints/minute.

VII. MAPPING

VII-01. Portals - The peripheral geologic mapping method was used to map the adits, drifts and portals. The following areas with their associated structures were mapped.

The North Portal (No. 1) was excavated and constructed on a bench at elevation 6080. It lies within the contact between the Abo Mudstone below and the Agua Zarca Sandstone above at elevation 6084. A single one inch open vertical joint was present in the sandstone which ran along the center of the portal and had an attitude of N 85° E. The North Portal foundations were excavated and installed in the Abo Mudstone. The Abo Mudstone is dark red to brown in color with a one foot thick dark blue section above topped by a two to three inch green clay layer. It is soft to very soft and unfractured. The Agua Zarca Sandstone is white in color, moderately hard to hard, medium to coarse grained and conglomertic with depth.

The South Portal (No. 2) was excavated and constructed on a bench at elevation 6093. It was also located within the contact between the Agua Zarca Sandstone and the Abo Mudstone at elevation 6094. Two (2) 1 1/2 - 2-inch open joints were present in the sandstone. The South Portal foundations were excavated and installed in the Abo Mudstone. The composition of the sandstone and mudstone were the same in the South Portal area as in the North Portal area although beds of similar lithology varied somewhat in thickness between portals.

VII-02. Tunnels - Structures that were encountered and mapped during the construction of the adits and drifts were joints, bedding planes, seeps and faults. The following is a brief description of all such structures. For a more detailed examination refer to maps, Appendix 7.

VII-02.1 Joint Separation and Spacing - Joint separation and spacing varied throughout the north and south adits and drifts. Separation ranged between 0 (tight or closed joints) and 2 inches (open joints). Spacing varied from 4 to 100 feet for open joints and 2 to 20 feet for closed joints. Open and closed joints were restricted to the Agua Zarca Sandstone. At the contact between the Agua Zarca Sandstone and the Abo Mudstone the joints disappeared. There were however a few areas within the Mudstone (near the contact with the sandstone) where slickensides were present which may indicate that the joints continued through the mudstone. Refer to maps in Appendix 7 for orientation configuration of joints.

The North Adit was approximately 900 feet in length and started at Station 1+82. Open joint spacing on the first 300 feet (1+82 to 4+82) averaged 15 feet. The next 100 feet (4+83 to 5+84), spacing was much tighter ranging between 4 to 6 feet. The remaining length of the tunnel from Station 5+85 to 10+80, open joints were few in number and spaced anywhere from 5 to 100 feet apart. Closed joint spacing alternated from tight to wide throughout the length of the tunnel. Between station 1+82 to 4+98 and 6+98 to 8+28, spacing was 2 to 10 feet apart. Spacing widened to 10 to 15 feet between Station 4+98 to 6+98 and 8+28 to 10+80.

The North Drift was 360 feet in length and started in the center of the North Adit at Station 2+89. From Station 0+00 to 0+62, open joints were spaced 5 to 10 feet apart and intersected each other producing loose rock. From 0+62 to 3+60, open joint spacing ranged between 10 to 50 feet apart. Closed joints which were present between Station 0+85 to 1+90 were closely spaced, 2 to 10 feet apart. The South Adit was approximately 784 feet in length and started at Station 0+66. Open and closed joint spacing alternated from tight to wide throughout the length of the tunnel. Open joints between Station 0+76 to 4+36 were spaced from 5 to 20 feet apart. From Station 4+82 to 5+18 spacing tightened to 1 - 10 feet then widened from Station 5+18 to 8+50 to 25 - 140 feet. Closed joints between Station 0+66 to 5+06 and 6+46 to 7+66 ranged between 2 and 10 feet apart between the previous two areas (5+06 to 6+46) closed joints widened out to 25 to 40 feet apart.

The South Drift extended 200 feet and started in the center of the South Adit at Station 4+50. Few open or closed joints were present in the South Drift. Where they did exist open joint spacing was 10 to 40 feet apart and closed joint spacing was 5 to 10 feet apart. Refer to maps for further details, Appendix 7.

VII-02.2 Joint Orientation - The North Adit was excavated in a direction running S89°W. All closed joints and most open joints encountered were oriented near perpendicular with respect to the tunnel. The directions of the joints were NW - SE and NS $\pm$ 10° to 20° with a dip of 70° or greater. A few open joints ran near parallel with respect to the tunnel with a direction NE - SW dipping vertically.

The North Drift was excavated in a direction N 31°W. All open joints and most closed joints ran near perpendicular with respect to the tunnel. Their directions were NE - SW and EW $\pm$ 10° to 20° with a dip of 70° or greater. Closed joints that ran near parallel to the tunnel had a direction of NW - SE and dipped 60° or greater.

The South Adit was excavated in the direction S 14°W to S 44°W. Both open and closed joints ran near perpendicular with respect to the tunnel. The direction of the joints was NW - SE with a dip between 60° to 85°.

The South Drift was excavated in the direction S 46°E. Closed joints ran near perpendicular to the tunnel while open joints ran parallel with respect to the tunnel. Closed joints had a direction NE - SW and dipped between 70° to 85°. Open joints had a direction NW - SE and dipped between 70° to 90°. For furth details refer to maps and joint orientation diagrams in Appendix 4, 7 and 10.

VII-02.3 Faulting - Faulting in the adits and drifts was moderate. Faulting was more abundant in the south area than in the north area. In the North Drift, no faulting was present. In the North Adit some faulting was present between Station 5+52 to 6+46 with displacements ranging from 1 to 5 inches. Two areas in the South Drift displayed faulting. At Station 1+20 faulting was present with a maximum displacement of 6 inches. Between Stations 1+47 and 2+00, more faulting was present but with smaller displacements (3 inches). The majority of faulting was encountered in the South Adit. Between Station 4+90 and 8+40, faulting was most abundant. Although faulting was greatest here, displacement remained low - 4 to 6 inches for each fault. Faulting was concentrated in small groups of closely spaced faults, 2 to 4 feet apart. Groups of faults were separated 20 to 80 feet apart. Refer to Appendix 7 for details and Appendix 9 for photographs.

VII-02.4 Materials Encountered - All adits and drifts were constructed in the lower Agua Zarca Sandstone. Both North and South Adits began at the contact between the Abo Mudstone below and the Agua Zarca Sandstone above. The South Adit remained within the contact for approximately 360 feet (Station 4+24) and the north for approximately 320 feet (Station 5+02). A 1 to 3 foot thick continuous conglomertic bed existed above the Abo Mudstone for 335 feet in the South Adit and 400 feet in the North Adit before it pinched out. All tunnels remained in the lower Agua Zarca Sandstone throughout their lengths. The Agua Zarca Sandstone consisted of moderately hard to hard white sandstone, softer, but still moderately hard blue and brown sandstone, thin non-continuous beds of conglomerate and irregular pockets of black mudstone and conglomerate. All sandstones were moderately to highly fractured. One area which differed from this was between 7+08 to 7+65 in the North Adit. It consisted of a dark blue to black, soft, unfractured horizontally bedded mudstone which was restricted to the crown of the tunnel. (Refer to maps, Appendix 7 for detail and Appendix 6 for geologic sections along adits and drifts.

VIII. INVERT CONSTRUCTION

Unfinished concrete was used to form the sub-invert mudsill, and finished concrete to complete the adit invert. Prior to installation of the sub-invert the invert was excavated down to fresh rock. Dams and pumps were set up to divert water away from the fresh surface and concrete was placed to form the mudsill. The installation of the sub-invert was performed in small sections so the work could be completed quickly to protect the freshly exposed mudstone. Once the drilling program was completed a finished concrete invert was installed with water channels running down each side of the invert.

IX. FUTURE PROBLEMS

A large section of rock above the North Portal area broke off of the canyon wall during the first week of June 1990. A large block landed on the portal bench, narrowly missing the portal structure. Another block is beginning to form in front of a new set of encchelon cracks above the portal. Although this does not pose a threat to the adit or drift, serious damage may occur to the portal structure and the power station if such an event should take place. This problem was not related to adit construction.

A potential problem may exist in the adits themselves. Sluffing off of shotcrete protecting and supporting the mudstone has already been observed. If this should continue the mudstone would be exposed to water and air which would cause slaking and deterioration. If this should occur the mudstone could be protected by shotcreting again. This is a maintenance possibility and would not affect adit operation or safety.

The contractor used rounded river rock fill to protect the portals against damage from falling rock instead of specified angular rock removed during excavation of the portals. A new contract will replace the rounded rock with angular rock.

X. INSTRUMENTATION

No foundation instrumentation was installed in the adits or drifts at Abiquiu Dam and Reservoir. A weir was constructed within each portal to measure the seepage flows. Individual measurements of pressure or seepage at each drainhole are possible if needed.

XI. CONCLUSION

The adits were completed very nearly as designed with no significant construction problems noted. Water seepage, mudstone deterioration, fractures nor faulting presented any problems. Rock quality was good throughout and the geology did not differ substantially from the exploration holes. Tunnel and support methods selected (roadheader, rockbolts and shotcrete) were very appropriate and produced a completed project with no significant deviations.

APPENDIX 1

LIST OF REFERENCES

REFERENCES

1. "Feature Design Memorandum Number 20, Seepage Control Adits, Abiquiu Dam, New Mexico", by Tierra Engineering Consultants, Inc., dated 19 February 1988.

2. "Seismic and Seepage Report for Abiquiu Dam" Rio Grande Basin, Rio Chama, New Mexico", by Tierra Engineering Consultants, Inc., dated 9 December 1986.

3. "Plans and Specification for Seepage Control Adits, Abiquiu Dam, New Mexico", by Tierra Engineering Consultants, Inc. dated 18 November 1988.

APPENDIX 2

TESTING: UNCONFINED COMPRESSIVE STRENGTH, DENSITY AND MODULES OF ELASTICITY

ABIQUIU ADITS
UNCONFINED COMPRESSIVE STRENGTHS
DENSITY AND MODULUS OF ELASTICITY

CORE HOLE	DEPTH	ROCK TYPE	COMPRESS. STRENGTH (PSI)	DENSITY (PCF)	MODULUS OF ELAS.
AB-C-1	119.6-120.4	SANDSTONE	3,140	147	----
AB-C-1	132.9-133.5	SANDSTONE	3,300	148	----
AB-C-1	174.1-175.1	SANDSTONE	1,569	140	---
AB-C-1	250.5-252.0	MUDSTONE	1,146	142	---
AB-C-1	257.4-258.5	MUDSTONE	321	134	---
AB-C-1	260.0-261.0	SANDSTONE	2,879	151	----
AB-C-1	269.4-270.2	SANDSTONE	6,332	152	---
AB-C-1	273.0-274.0	SANDSTONE	3,357	142	----
AB-C-1	277.4-278.1	SANDSTONE	793	---	1.46E+06
AB-C-1	279.4-280.2	SANDSTONE	2,733	138	----
AB-C-2	128.6-129.9	MUDSTONE	958	144	---
AB-C-2	135.7-136.8	SANDSTONE	5,356	151	----
AB-C-2	147.7-148.8	SANDSTONE	3,545	146	----
AB-C-2	205.4-205.9	SANDSTONE	10,678	162	----
AB-C-2	241.5-242.0	SANDSTONE	251	153	----
AB-C-2	244.1-245.2	SANDSTONE	1,303	---	1.27E+06
AB-C-2	253.0-254.2	SANDSTONE	1,083	142	----
AB-C-2	263.5-264.5	MUDSTONE	907	145	---
AB-C-3	24.5-25.0	MUDSTONE	760	130	---
AB-C-3	43.1-44.0	SANDSTONE	3,982	146	----
AB-C-3	43.1-44.0	SANDSTONE	3,983	146	---
AB-C-3	45.2-45.8	SANDSTONE	3,113	---	3.96E+05
AB-C-3	54.5-55.2	SANDSTONE	1,771	143	----
AB-C-3	66.4-67.4	MUDSTONE	247	139	---
AB-C-4	18.0-18.7	MUDSTONE	295	138	---

AB-C-4	24.6-26.1	MUDSTONE	2,117	143	---
AB-C-4	31.0-32.5	SANDSTONE	902	145	----
AB-C-4	40.5-41.3	SANDSTONE	2,918	137	----
AB-C-4	45.7-47.2	SANDSTONE	2,683	126	----
AB-C-4	51.3-52.1	SANDSTONE	3,178	152	----
AB-C-4	66.2-67.4	MUDSTONE	501	143	---
AB-C-5	207.4-208.2	SANDSTONE	4,616	---	----
AB-C-5	218.1-219.0	SANDSTONE	2,863	150	----
AB-C-5	333.4-334.2	SANDSTONE	5,077	151	---
AB-C-5	337.1-337.7	SANDSTONE	2,966	143	---
AB-C-5	339.1-340.2	CONGLOM.	3,214	144	---
AB-C-5	342.7-343.3	SANDSTONE	4,116	147	---
AB-C-5	348.9-349.6	SANDSTONE	3,814	141	---
AB-C-7	107.2-108.1	SANDSTONE	6,899	153	----
AB-C-7	132.1-132.6	SANDSTONE	1,745	154	----
AB-C-7	251.6-252.3	SANDSTONE	2,573	129	----
AB-C-7	254.0-255.0	SANDSTONE	2,140	144	----
AB-C-7	268.5-269.2	SANDSTONE	2,664	141	----
AB-C-8	26.3-27.0	SILTSTONE	4,700	140	----
AB-C-8	124.6-125.6	SANDSTONE	1,556	130	----
AB-C-8	135.0-135.8	SANDSTONE	1,994	128	----
AB-C-8	146.0-147.2	SANDSTONE	1,464	132	---
AB-C-8	149.2-150.1	MUDSTONE	1,001	143	---
AB-C-9	34.8-35.8	SANDSTONE	1,414	125	----
AB-C-9	36.5-38.2	SANDSTONE	1,992	125	----
AB-C-9	41.0-42.0	SANDSTONE	5,104	155	----
AB-C-9	45.3-46.0	MUDSTONE	707	146	---

ABIQUIU ADITS ROCK CORE
SWELL AND SWELL PRESSURE TESTS

HOLE NUMBER	DEPTH	DRY DENSITY (PCF)	PERCENT OF SWELL	SEATING LOAD (TSF)	SWELL CONTROL PRESSURE (TSF)
AB-C-1	184.2 - 185.7	132.9	2.2	0.1	FREE
AB-C-1	184.2 - 185.7	133.1	1.1	0.1	2.7
AB-C-1	257.4 - 258.5	133.8	2.1	0.1	FREE
AB-C-1	257.4 - 258.5	133.6	1.2	0.1	2.0
AB-C-2	128.6 - 129.9	141.0	1.9	0.1	FREE
AB-C-2	128.6 - 129.9	142.9	1.1	0.1	1.8
AB-C-2	233.7 - 234.7	124.9	2.6	0.1	FREE
AB-C-2	233.7 - 234.7	123.8	1.4	0.1	5
AB-C-2	263.5 - 264.5	145.3	1.5	0.1	FREE
AB-C-2	263.5 - 264.5	144.2	0.7	0.1	3.2
AB-C-3	66.4 - 67.4	134.1	1.1	0.1	FREE
AB-C-4	18.0 - 18.7	132.6	0.6	0.1	FREE
AB-C-4	66.2 - 67.4	140.2	0.5	0.1	FREE
AB-C-4	66.2 - 67.4	141.7	0.8	0.1	0.9
AB-C-7	268.5 - 269.2	151.3	0.9	0.1	FREE
AB-C-8	149.2 - 150.1	142.8	1.4	0.1	FREE
AB-C-8	26.3 - 27.0	129.6	2.5	0.1	FREE
AB-C-9	45.3 - 46.0	141.3	0.8	0.1	FREE
AB-C-9	57.4 - 59.0	139.8	1.0	0.1	FREE
AB-C-9	57.4 - 59.0	141.1	0.5	0.1	2.2

APPENDIX 3

SEEPAGE FLOWS VERSUS LAKE LEVELS
DURING CONSTRUCTION OF ADITS

POOL LEVEL VERSUS ADIT DISCHARGE

	Date	Pool Elevation (Ft.)	South Discharge (Gal/Min)	North Discharge Gal/Min)
	August 14, 1989	6213.68	220	—
	August 15, 1989	6213.65	220	—
	August 16, 1989	6213.73	220	—
	August 17, 1989	6213.74	220	—
	August 18, 1989	6213.65	220	—
	August 19, 1989	6213.64	220	—
	August 21, 1989	6213.61	220	—
	August 22, 1989	6212.75	240	—
	August 23, 1989	6212.10	230	—
	August 24, 1989	6212.01	220	—
	August 25, 1989	6211.05	230	—
	August 28, 1989	6212.01	230	—
	August 29, 1989	6211.74	220	—
	August 30, 1989	6211.58	220	—
	August 31, 1989	6211.40	230	—
	September 5, 1989	6210.56	280	—
	September 6, 1989	6210.54	300	—
	September 7, 1989	6210.57	300	—
	September 8, 1989	6210.54	300	—
	September 9, 1989	6210.75	320	500
	September 11, 1989	6210.48	300	500
	September 12, 1989	6210.53	300	500
A	September 13, 1989	6210.54	300	520
	September 14, 1989	6210.78	300	500
	September 15, 1989	6210.51	300	500
	September 18, 1989	6210.61	240	500
	September 19, 1989	6210.71	300	520
	September 20, 1989	6210.61	300	520
	September 21, 1989	6210.51	300	550
	September 22, 1989	6210.48	300	550
	September 25, 1989	6210.47	300	550
	September 26, 1989	6210.59	300	540
	September 27, 1989	6210.54	300	550
	September 28, 1989	6210.78	300	520
	September 29, 1989	6210.85	300	520
	October 2, 1989	6211.03	300	540
	October 3, 1989	6211.24	300	540
	October 4, 1989	6211.45	300	540
	October 5, 1989	6211.48	300	540
	October 6, 1989	6211.45	300	520
	October 7, 1989	6211.47	300	520
	October 9, 1989	6211.48	300	520
	October 10, 1989	6211.42	300	520
	October 11, 1989	6211.40	300	550
B	October 20, 1989	6211.61	300	540
	October 23, 1989	6211.75	300	540

POOL LEVEL VERSUS ADIT DISCHARGE (Continued)

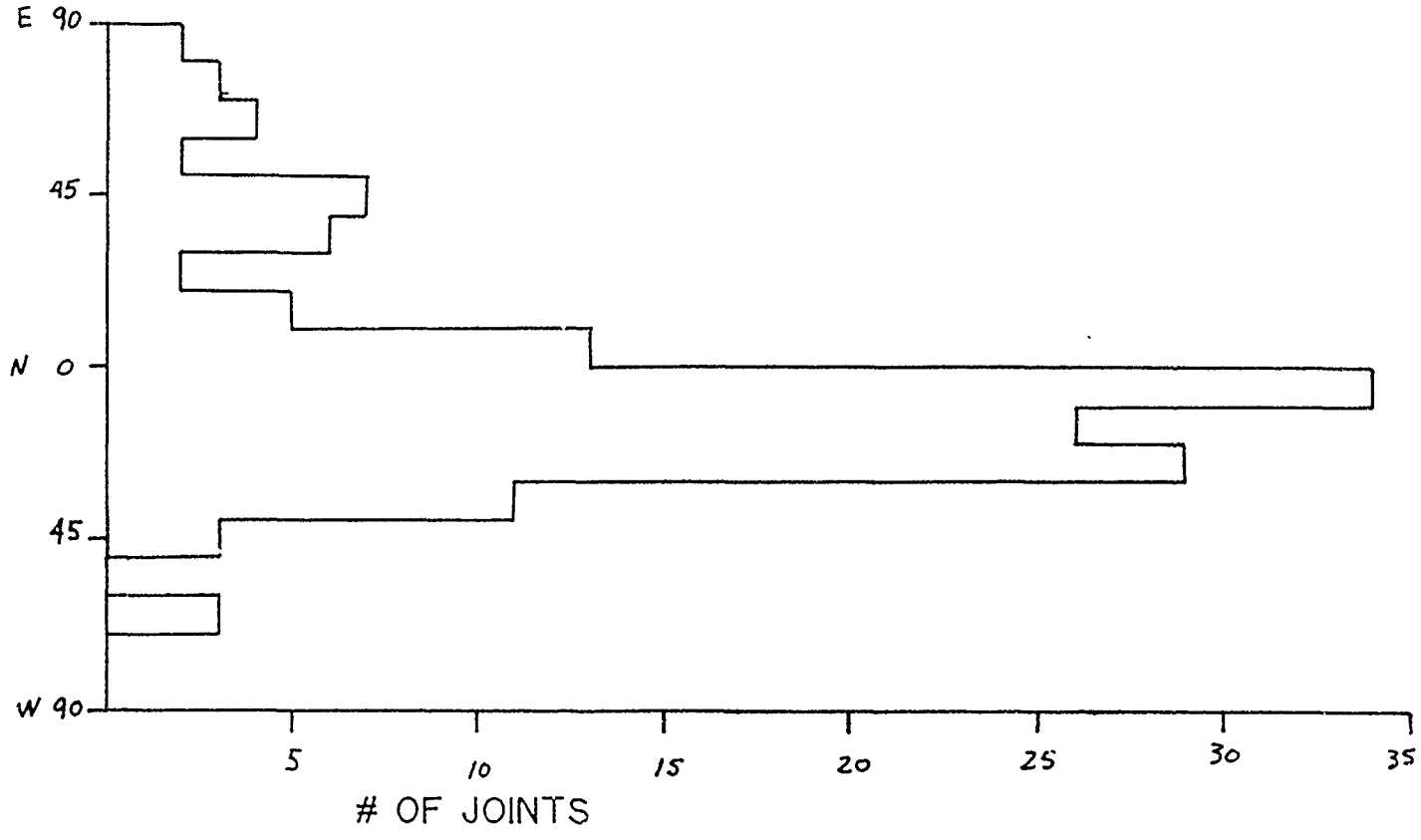
	Date	Pool Elevation (Ft.)	South Discharge (Gal/Min)	North Discharge Gal/Min)
	November 6, 1989	6211.89	300	540
	November 8, 1989	6211.93	300	540
	November 15, 1989	6212.00	300	540
	November 16, 1989	6212.15	300	540
	November 20, 1989	6212.21	300	540
	November 27, 1989	6212.48	300	540
	November 29, 1989	6212.55	300	540
	December 11, 1989	6212.89	310	540
	December 12, 1989	6212.85	310	540
C	December 15, 1989	6212.86	310	540
	December 22, 1989	6212.84	310	540
	January 2, 1990	6212.90	310	540
	January 9, 1990	6212.85	310	540
	January 11, 1990	6212.83	310	540
	January 16, 1990	6212.87	310	540
	January 18, 1990	6212.85	310	540
D	January 19, 1990	6212.85	310	540

A - South Adit and Drift Completed
B - North Adit and Drift Completed
C - South Side Drainholes Completed
D - North Side Drainholes Completed

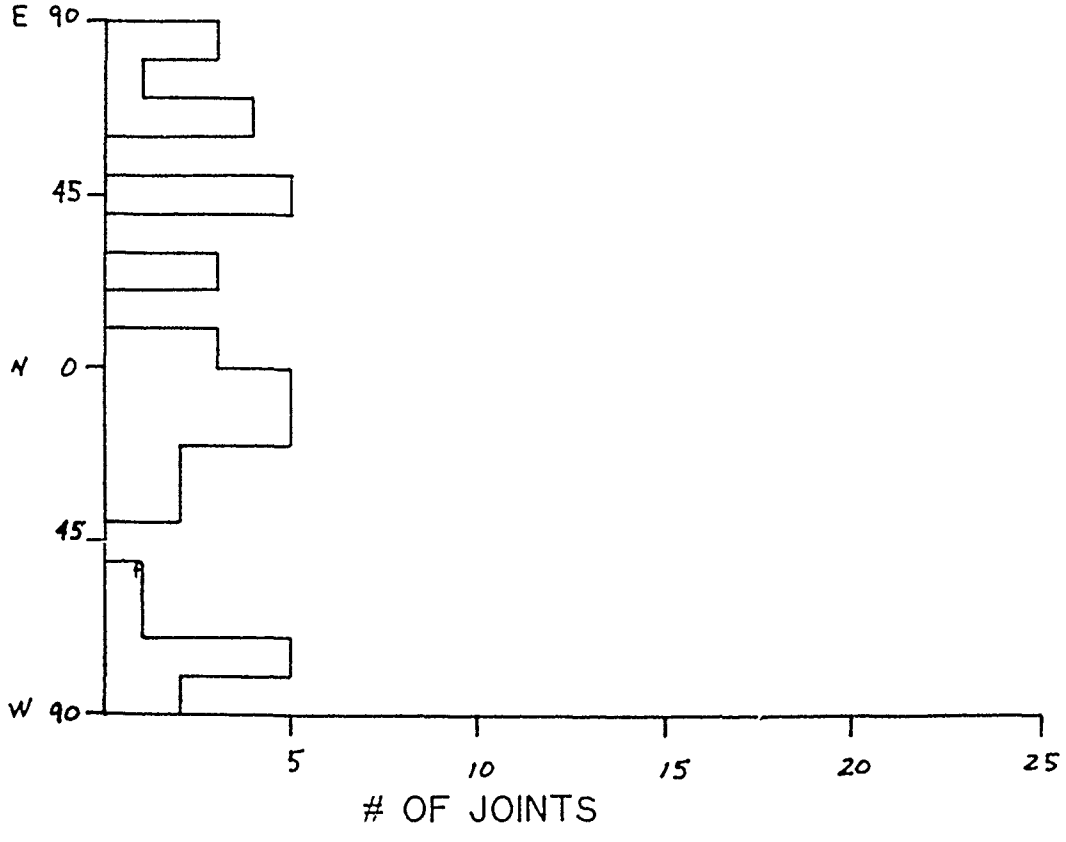
APPENDIX 4

JOINT ORIENTATION DIAGRAMS

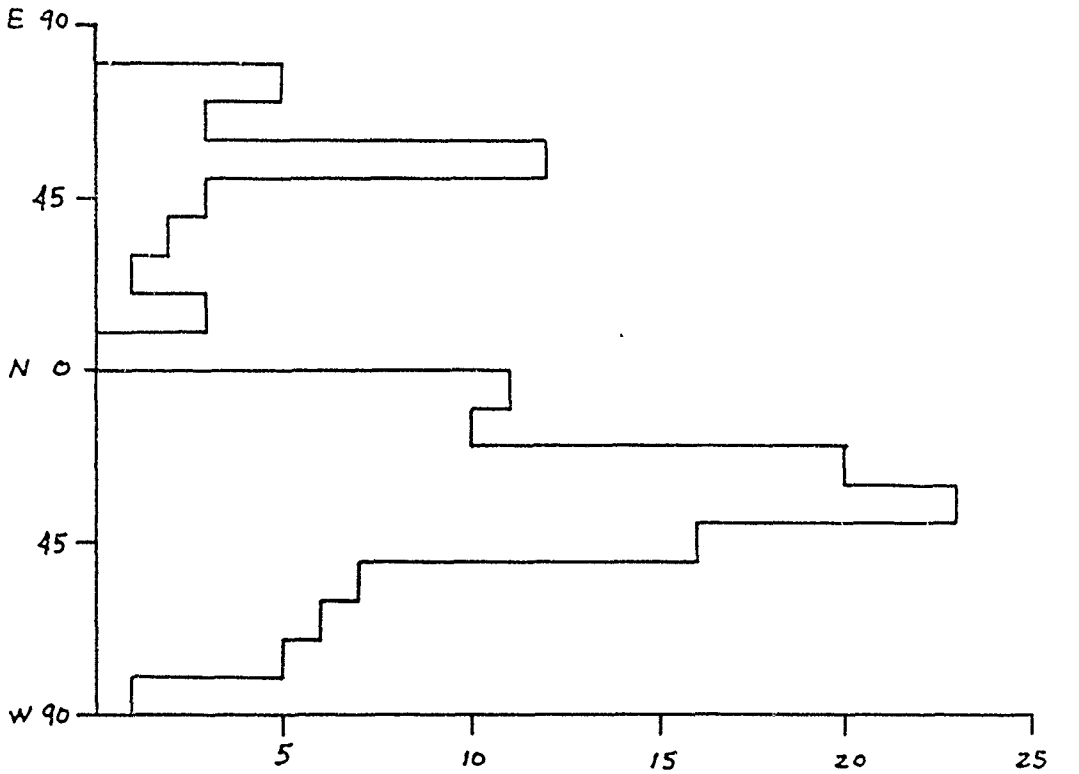
NORTH ADIT # 1



NORTH DRIFT #1

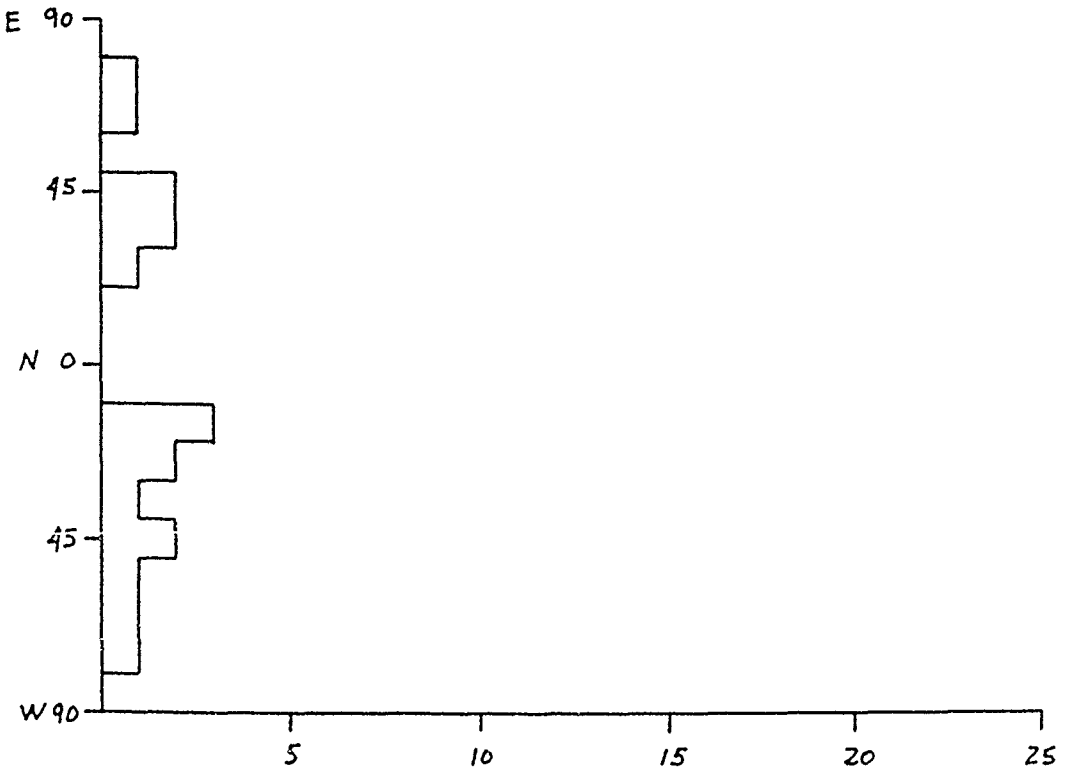


SOUTH ADIT # 2



OF JOINTS

SOUTH DRIFT # 2



OF JOINTS

APPENDIX 5

CHRONOLOGICAL RECORD OF DRILLING PROGRAM

CHRONOLOGICAL RECORD OF DRILLING PROGRAM

Date	Station	Direction	Depth (Ft.)	Orientation
October 5-9 1989	0+20 South Drift	Uphole	147	Vertical
October 10-11, 1989	0+40 South Drift	Uphole	147	Vertical
October 12, 1989	0+60 South Drift	Uphole	147	Vertical
October 13-14, 1989	0+80 South Drift	Uphole	147	Vertical
October 14-16, 1989	1+00 South Drift	Uphole	146	Vertical
October 18, 1989	1+20 South Drift	Uphole	146	Vertical
October 19, 1989	1+40 South Drift	Uphole	146	Vertical
October 19-20, 1989	1+60 South Drift	Uphole	147	Vertical
October 20-21, 1989	1+80 South Drift	Uphole	145	Vertical
October 23, 1989	2+00 South Drift	Uphole	145	Vertical
	2+00 South Drift	Downhole	12	Vertical
	1+80 South Drift	Downhole	12	Vertical
	1+60 South Drift	Downhole	12	Vertical
	1+40 South Drift	Downhole	12	Vertical
	1+20 South Drift	Downhole	12	Vertical
October 24, 1989	1+00 South Drift	Downhole	12	Vertical
	0+80 South Drift	Downhole	12	Vertical
	0+60 South Drift	Downhole	12	Vertical
	0+40 South Drift	Downhole	12	Vertical
	0+20 South Drift	Downhole	12	Vertical
October 24-25, 1989	4+30	Uphole	118	Vertical
October 25, 1989	4+50	Uphole	118	Vertical
October 26, 1990	5+20 South Adit	--	--	--
	No. 6	Downhole	20	Inclined
	No. 7	Downhole	38	Inclined
	No. 8	Downhole	57	Inclined
October 27, 1989	No. 9	Downhole	77	Inclined
	No. 10	Downhole	97	Inclined
October 28-30, 1989	No. 14	Uphole	142	Inclined
	No. 22	Downhole	117	Inclined
	No. 1	Uphole	149	Inclined
	No. 17	Downhole	20	Inclined
October 31, 1989	No. 18	Downhole	38	Inclined
	No. 20	Downhole	77	Inclined
November 1, 1989	No. 21	Downhole	97	Inclined
November 3-6, 1989	2+50 South Adit	Uphole	55	Vertical
	2+70 South Adit	Uphole	55	Vertical
	5+20 South Adit	--	--	--
	No. 2	Uphole	153	Inclined

CHRONOLOGICAL RECORD OF DRILLING PROGRAM

Date	Station	Direction	Depth (Ft.)	Orientation
November 7-8, 1989	2+90 South Adit	Uphole	55	Vertical
	5+70 South Adit	Uphole	147	Vertical
November 8-9, 1989	5+90 South Adit	Uphole	147	Vertical
	3+10 South Adit	Uphole	119	Vertical
	3+30 South Adit	Uphole	119	Vertical
November 10, 1989	6+10 South Adit	Uphole	146	Vertical
	3+50 South Adit	Uphole	119	Vertical
November 11-14, 1989	5+50 South Adit	Uphole	146	Vertical
	4+10 South Adit	Uphole	118	Vertical
	3+70 South Adit	Uphole	119	Vertical
	3+90 South Adit	Uphole	119	Vertical
	6+30 South Adit	Uphole	146	Vertical
November 14-15, 1989	6+50 South Adit	Uphole	146	Vertical
	6+70 South Adit	Uphole	146	Vertical
	5+20 South Adit	--	--	--
	No. 3 South Adit	Uphole	159	Inclined
	No. 4 South Adit	Uphole	168	Inclined
	No. 5 South Adit	Uphole	178	Inclined
November 15-16, 1989	6+90 South Adit	Uphole	145	Vertical
	2+00 South Drift	--	--	--
	No. 1	Uphole	148	Inclined
	5+20 South Adit	--	--	--
	No. 11	Uphole	149	Inclined
November 16-17, 1989	2+00 South Drift	--	--	--
	No. 2	Uphole	152	Inclined
	7+10 South Adit	Uphole	145	Vertical
	7+30 South Adit	Uphole	145	Vertical
	5+20 South Adit	--	--	--
	No. 12	Uphole	145	Vertical
	5+30 South Adit	Uphole	147	Vertical
November 17-18, 1989	7+50 South Adit	Uphole	144	Vertical
	7+70 South Adit	Uphole	144	Vertical
November 18-20, 1989	7+90 South Adit	Uphole	144	Vertical
	5+20 South Adit	--	--	--
	No. 15	Uphole	154	Inclined
	No. 16	Uphole	167	Inclined
	2+00 South Drift	--	--	--
	No. 3	Uphole	158	Inclined

CHRONOLOGICAL RECORD OF DRILLING PROGRAM
(Continued)

Date	Station	Direction	Depth (Ft.)	Orientation
November 21, 1989	2+00 South Drift	--	--	--
	No. 4	Uphole	166	Inclined
	No. 5	Uphole	177	Inclined
	8+10 South Adit	Uphole	144	Vertical
November 22, 1990	8+30 South Adit	Uphole	144	Vertical
November 27, 1989	1+90 South Adit	Uphole	144	Vertical
	2+10 South Adit	Uphole	57	Vertical
	2+30 South Adit	Uphole	58	Vertical
	4+70 South Adit	Uphole	146	Vertical
	5+10 South Adit	Uphole	147	Vertical
	8+50 South Adit	--	--	--
	No. 1	Uphole	146	Inclined
	No. 2	Uphole	150	Inclined
November 28, 1989	8+50 South Adit	--	--	--
	No. 3	Uphole	156	Inclined
	No. 7	Downhole	44	Inclined
	No. 10	Downhole	99	Inclined
	7+10 South Adit	--	--	--
	No. 6	Downhole	18	Inclined
	No. 7	Downhole	37	Inclined
	No. 8	Downhole	57	Inclined
	No. 9	Downhole	77	Inclined
	No. 10	Downhole	97	Inclined
November 29, 1989	1+30 South Adit	Uphole	57	Vertical
	1+50 South Adit	Uphole	57	Vertical
	1+70 South Adit	Uphole	57	Vertical
	8+50 South Adit	--	--	--
	No. 4	Uphole	165	Inclined
	7+10 South Adit	--	--	--
	No. 1	Uphole	147	Inclined

CHRONOLOGICAL RECORD OF DRILLING PROGRAM
(Continued)

Date	Station	Direction	Depth (Ft.)	Orientation
November 30, 1989	0+90 South Adit	Uphole	25	Vertical
	0+90 South Adit	--	--	--
	No. 1	Uphole	16	Inclined
	No. 2	Uphole	36	Inclined
	No. 3	Uphole	16	Inclined
	1+10 South Adit	Uphole	25	Vertical
	8+50 South Adit	Uphole	144	Vertical
	8+50 South Adit	--	--	--
	No. 5	Uphole	175	Inclined
	0+90 South Adit	--	--	--
	No. 4	Uphole	36	Inclined
	No. 5	Uphole	56	Inclined
December 1-2, 1989	3+90 Soutn Adit	Downhole	15	Vertical
	4+10 South Adit	Downhole	15	Vertical
	4+30 South Adit	Downhole	15	Vertical
	4+50 South Adit	Downhole	15	Vertical
	4+70 South Adit	Downhole	15	Vertical
	4+90 South Adit	Downhole	15	Vertical
	5+10 South Adit	Downhole	15	Vertical
	5+30 South Adit	Downhole	15	Vertical
	5+50 South Adit	Downhole	15	Vertical
	5+70 South Adit	Downhole	15	Vertical
	5+90 South Adit	Downhole	15	Vertical
	6+10 South Adit	Downhole	15	Vertical
	6+30 South Adit	Downhole	15	Vertical
	7+10 South Adit	--	--	--
	No. 4	Uphole	144	Inclined
	No. 5	Uphole	156	Inclined
	8+50 South Adit	Uphole	146	Vertical
December 4-5, 1989	4+90 South Adit	Uphole	118	Vertical
	8+50 South Adit	--	--	--
	No. 8	Downhole	62	Inclined
	No. 9	Downhole	80	Inclined
	6+70 South Adit	Downhole	15	Vertical
	6+90 South Adit	Downhole	15	Vertical
	0+90 South Adit	Downhole	10	Vertical
	1+10 South Adit	Downhole	10	Vertical
	1+30 South Adit	Downhole	10	Vertical

CHRONOLOGICAL RECORD OF DRILLING PROGRAM
(Continued)

Date	Station	Direction	Depth (Ft.)	Orientation
December 4-5, 1989	1+50 South Adit	Downhole	10	Vertical
	1+70 South Adit	Downhole	10	Vertical
	1+90 South Adit	Downhole	10	Vertical
	2+10 South Adit	Downhole	10	Vertical
	2+30 South Adit	Downhole	10	Vertical
	2+50 South Adit	Downhole	10	Vertical
	2+70 South Adit	Downhole	10	Vertical
	2+90 South Adit	Downhole	10	Vertical
	3+10 South Adit	Downhole	10	Vertical
	3+30 South Adit	Downhole	10	Vertical
	3+50 South Adit	Downhole	10	Vertical
	3+70 South Adit	Downhole	10	Vertical
December 6-9, 1989	7+10 South Adit	Downhole	20	Vertical
	7+30 South Adit	Downhole	20	Vertical
	7+50 South Adit	Downhole	20	Vertical
	7+70 South Adit	Downhole	20	Vertical
	7+90 South Adit	Downhole	20	Vertical
	8+10 South Adit	Downhole	20	Vertical
	8+30 South Adit	Downhole	20	Vertical
	8+50 South Adit	Downhole	20	Vertical
	7+30 North Adit	Downhole	25	Vertical
	7+50 North Adit	Downhole	25	Vertical
	7+70 North Adit	Downhole	25	Vertical
	7+90 North Adit	Downhole	25	Vertical
	8+10 North Adit	Downhole	25	Vertical
	8+30 North Adit	Downhole	25	Vertical
	8+50 North Adit	Downhole	25	Vertical
	8+70 North Adit	Downhole	25	Vertical
	8+90 North Adit	Downhole	28	Vertical
	9+10 North Adit	Downhole	28	Vertical
	9+30 North Adit	Downhole	28	Vertical
	9+50 North Adit	Downhole	28	Vertical
	9+70 North Adit	Downhole	30	Vertical
	9+90 North Adit	Downhole	30	Vertical
	10+10 North Adit	Downhole	30	Vertical
	10+30 North Adit	Downhole	30	Vertical
	10+50 North Adit	Downhole	30	Vertical
	10+70 North Adit	Downhole	30	Vertical

CHRONOLOGICAL RECORD OF DRILLING PROGRAM
(Continued)

Date	Station	Direction	Depth (Ft.)	Orientation
December 6-9, 1989	8+50 South Adit	--	--	--
	No. 6	Downhole	29	Inclined
	7+10 South Adit	--	--	--
	No. 2	Uphole	151	Inclined
	No. 3	Uphole	135	Inclined
	5+20 South Adit	--	--	--
	No. 13	Uphole	132	Inclined
	No. 19	Uphole	57	Inclined
	2+80 North Drift	Downhole	23	Vertical
	3+00 North Drift	Downhole	23	Vertical
	3+10 North Drift	Downhole	23	Vertical
	3+20 North Drift	Downhole	23	Vertical
	3+40 North Drift	Downhole	23	Vertical
	3+60 North Drift	Downhole	23	Vertical
December 11-12, 1989	7+10 South Adit	--	--	--
	No. 4	Uphole	144	Inclined
	No. 5	Uphole	156	Inclined
	0+60 North Drift	Downhole	22	Vertical
	0+80 North Drift	Downhole	22	Vertical
	1+20 North Drift	Downhole	22	Vertical
	1+40 North Drift	Downhole	23	Vertical
	1+60 North Drift	Downhole	23	Vertical
	1+80 North Drift	Downhole	23	Vertical
	2+00 North Drift	Downhole	23	Vertical
	2+20 North Drift	Downhole	23	Vertical
	2+40 North Drift	Downhole	23	Vertical
	2+60 North Drift	Downhole	23	Vertical
	5+50 North Adit	Downhole	25	Vertical
	5+70 North Adit	Downhole	25	Vertical
	5+90 North Adit	Downhole	25	Vertical
	6+10 North Adit	Downhole	25	Vertical
	6+30 North Adit	Downhole	25	Vertical
	6+50 North Adit	Downhole	25	Vertical
December 11-12, 1989	6+70 North Adit	Downhole	25	Vertical
	6+90 North Adit	Downhole	25	Vertical
	7+10 North Adit	Downhole	25	Vertical

CHRONOLOGICAL RECORD OF DRILLING PROGRAM
(Continued)

Date	Station	Direction	Depth (Ft.)	Orientation
December 13-14, 1989	0+20 North Drift	Uphole	35	Vertical
	0+40 North Drift	Uphole	35	Vertical
	2+90 North Adit	Uphole	33	Vertical
	3+10 North Adit	Uphole	58	Vertical
	3+30 North Adit	Downhole	20	Vertical
	3+50 North Adit	Downhole	20	Vertical
	3+70 North Adit	Downhole	20	Vertical
	3+90 North Adit	Downhole	20	Vertical
	4+10 North Adit	Downhole	25	Vertical
	4+30 North Adit	Downhole	25	Vertical
	4+50 North Adit	Downhole	25	Vertical
	4+70 North Adit	Downhole	25	Vertical
	4+90 North Adit	Downhole	25	Vertical
	5+10 North Adit	Downhole	25	Vertical
	5+30 North Adit	Downhole	25	Vertical
December 15, 1989	0+60 North Drift	Uphole	58	Vertical
December 16-19, 1989	3+30 North Adit	Uphole	58	Vertical
	3+50 North Adit	Uphole	60	Vertical
	3+70 North Adit	Uphole	58	Vertical
	3+90 North Adit	Uphole	58	Vertical
	2+10 North Adit	Downhole	20	Vertical
	2+30 North Adit	Downhole	20	Vertical
	2+50 North Adit	Downhole	20	Vertical
	2+70 North Adit	Downhole	20	Vertical
	2+90 North Adit	Downhole	20	Vertical
	3+10 North Adit	Downhole	20	Vertical
December 20, 1989	4+10 North Adit	Uphole	59	Vertical
December 21-22, 1989	4+30 North Adit	Uphole	60	Vertical
	4+50 North Adit	Uphole	60	Vertical
	4+70 North Adit	Uphole	58	Vertical
	9+50 North Adit	--	--	--
	No. 1	Uphole	164	Inclined
	No. 2	Uphole	167	Inclined
	No. 3	Uphole	166	Inclined
December 26-29, 1989	0+80 North Drift	Uphole	173	Inclined

CHRONOLOGICAL RECORD OF DRILLING PROGRAM
(Continued)

Date	Station	Direction	Depth (Ft.)	Orientation
December 26-29, 1989	1+00 North Drift	Uphole	57	Vertical
	1+20 North Drift	Uphole	57	Vertical
	1+40 North Drift	Uphole	102	Vertical
	3+00 North Drift	Uphole	160	Vertical
	3+20 North Drift	Uphole	160	Vertical
	2+70 North Adit	Uphole	34	Vertical
December 30-January 2,	1+60 North Drift	Uphole	102	Vertical
	1+80 North Drift	Uphole	160	Vertical
	2+00 North Drift	Uphole	160	Vertical
	3+40 North Drift	Uphole	160	Vertical
	3+60 North Drift	Uphole	160	Vertical
	2+10 North Adit	Uphole	35	Vertical
	2+30 North Adit	Uphole	35	Vertical
December 30-January 2	2+50 North Adit	Uphole	36	Vertical
	4+90 North Adit	Uphole	55	Vertical
	5+10 North Adit	Uphole	100	Vertical
	3+20 North Adit	--	--	--
	No. 1	Uphole	40	Inclined
	No. 2	Uphole	52	Inclined
	No. 3	Uphole	68	Inclined
	9+50 North Adit	--	--	--
	No. 4	Uphole	181	Inclined
	No. 5	Uphole	190	Inclined
	No. 6	Uphole	201	Inclined
	3+60 North Drift	--	--	--
	No. 1	Uphole	162	Inclined
	No. 2	Uphole	165	Inclined
	No. 3	Uphole	171	Inclined
	No. 4	Uphole	179	Inclined
January 3-4, 1990	2+20 North Drift	Uphole	161	Vertical
	2+40 North Drift	Uphole	161	Vertical
	3+20 North Adit	--	--	--
	No. 4	Uphole	85	Inclined
	No. 5	Uphole	103	Inclined
	No. 6	Uphole	122	Inclined
	9+50 North Adit	--	--	--
	No. 7	Uphole	214	Inclined

CHRONOLOGICAL RECORD OF DRILLING PROGRAM
(Continued)

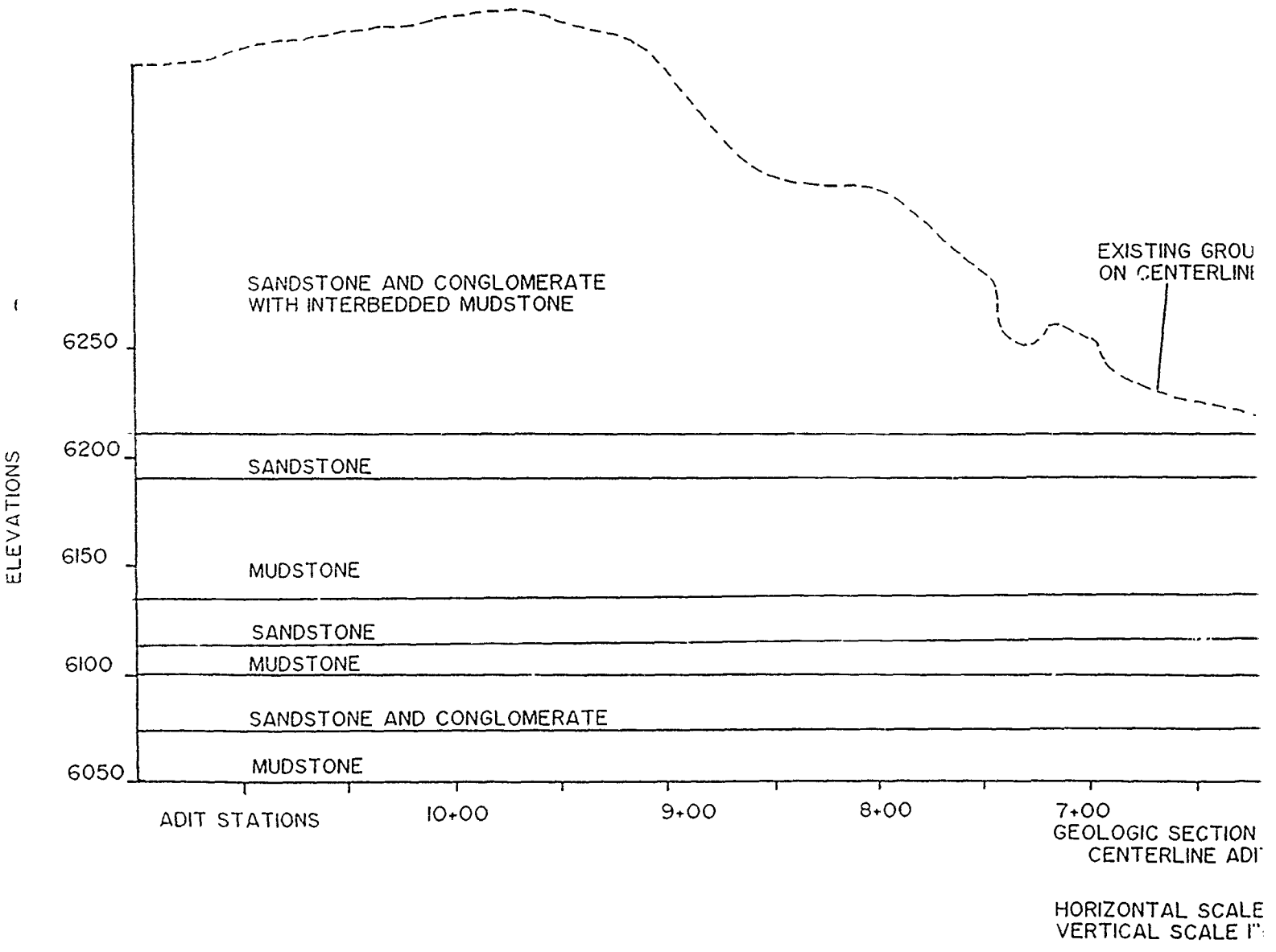
Date	Station	Direction	Depth (Ft.)	Orientation
January 3-4, 1989	3+60 North Drift			
	No. 5	Uphole	189	Inclined
January 5-9, 1989	2+60 North Drift	Uphole	160	Vertical
	2+80 North Drift	Uphole	160	Vertical
	5+30 North Adit	Uphole	101	Vertical
	5+50 North Adit	Uphole	101	Vertical
	5+70 North Adit	Uphole	101	Vertical
	5+90 North Adit	Uphole	101	Vertical
	6+10 North Adit	Uphole	101	Vertical
	9+10 North Adit	Uphole	156	Vertical
	9+30 North Adit	Uphole	156	Vertical
January 10-11, 1990	6+30 North Adit	Uphole	94	Vertical
	7+10 North Adit	Uphole	155	Vertical
	7+30 North Adit	Uphole	156	Vertical
	10+30 North Adit	Uphole	155	Vertical
	9+50 North Adit	Uphole	157	Vertical
	9+70 North Adit	Uphole	157	Vertical
	9+90 North Adit	Uphole	157	Vertical
	10+80 North Adit	--	--	--
	No. 5	Uphole	185	Inclined
January 12-16, 1990	6+50 North Adit	Uphole	95	Vertical
	6+70 North Adit	Uphole	95	Vertical
	6+90 North Adit	Uphole	95	Vertical
	7+50 North Adit	Uphole	157	Vertical
	7+70 North Adit	Uphole	157	Vertical
	7+90 North Adit	Uphole	156	Vertical
	8+90 North Adit	Uphole	155	Vertical
	10+50 North Adit	Uphole	155	Vertical
	10+70 North Adit	Uphole	155	Vertical
	10+80 North Adit	--	--	--
	No. 1	Uphole	158	Inclined
January 12-16, 1990	10+80 North Adit	-		
	No. 2	Uphole	161	Inclined
	No. 3	Uphole	167	Inclined
	No. 4	Uphole	175	Inclined
January 17-18, 1990	8+10 North Adit	Uphole	155	Vertical

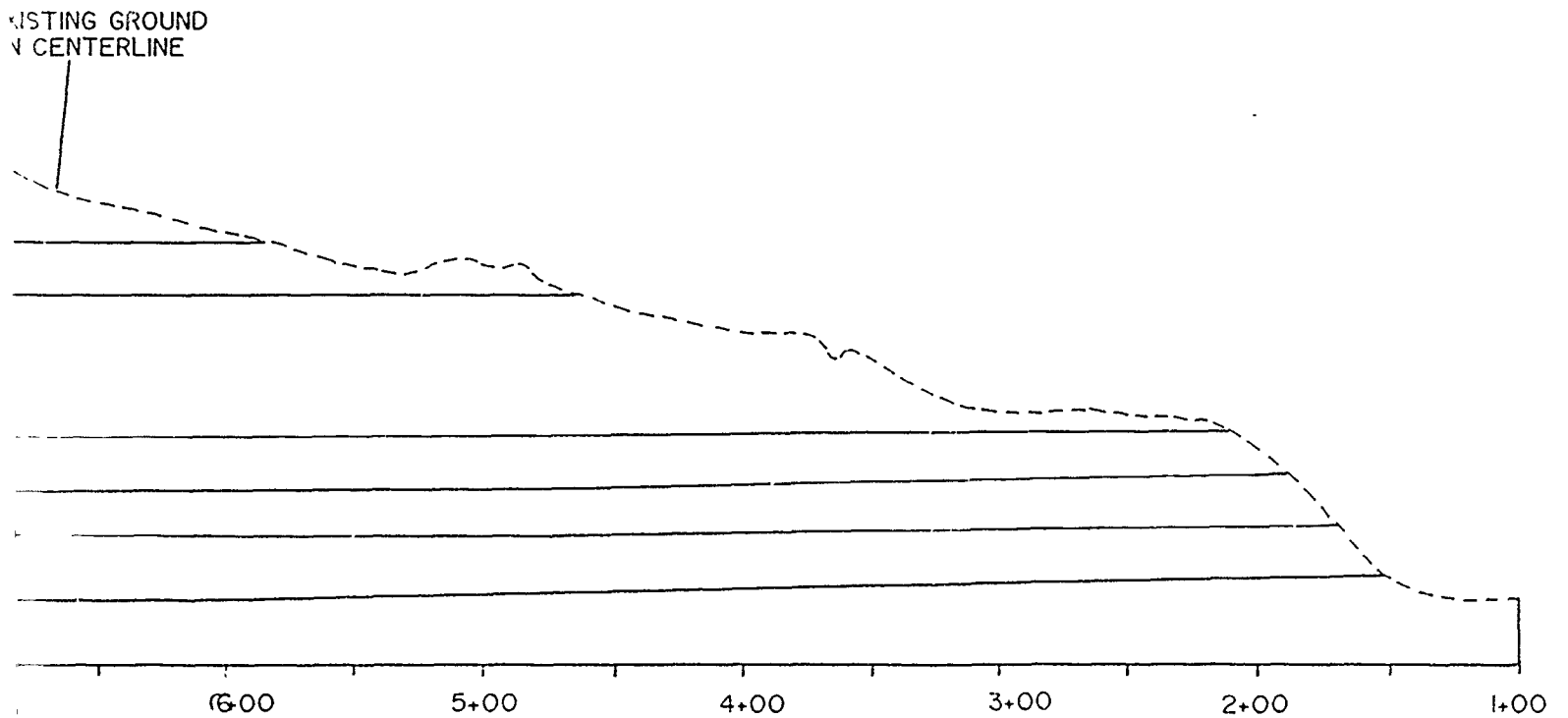
CHRONOLOGICAL RECORD OF DRILLING PROGRAM
(Continued)

Date	Station	Direction	Depth (Ft.)	Orientation
January 17-18, 1990	10+10 North Adit	Uphole	155	Vertical
	10+30 North Adit	Uphole	155	Vertical
	8+30 North Adit	Uphole	156	Vertical
	8+50 North Adit	Uphole	159	Vertical
	9+30 North Adit	Uphole	155	Vertical
January 19, 1990	9+10 North Adit	Uphole	155	Vertical

APPENDIX 6

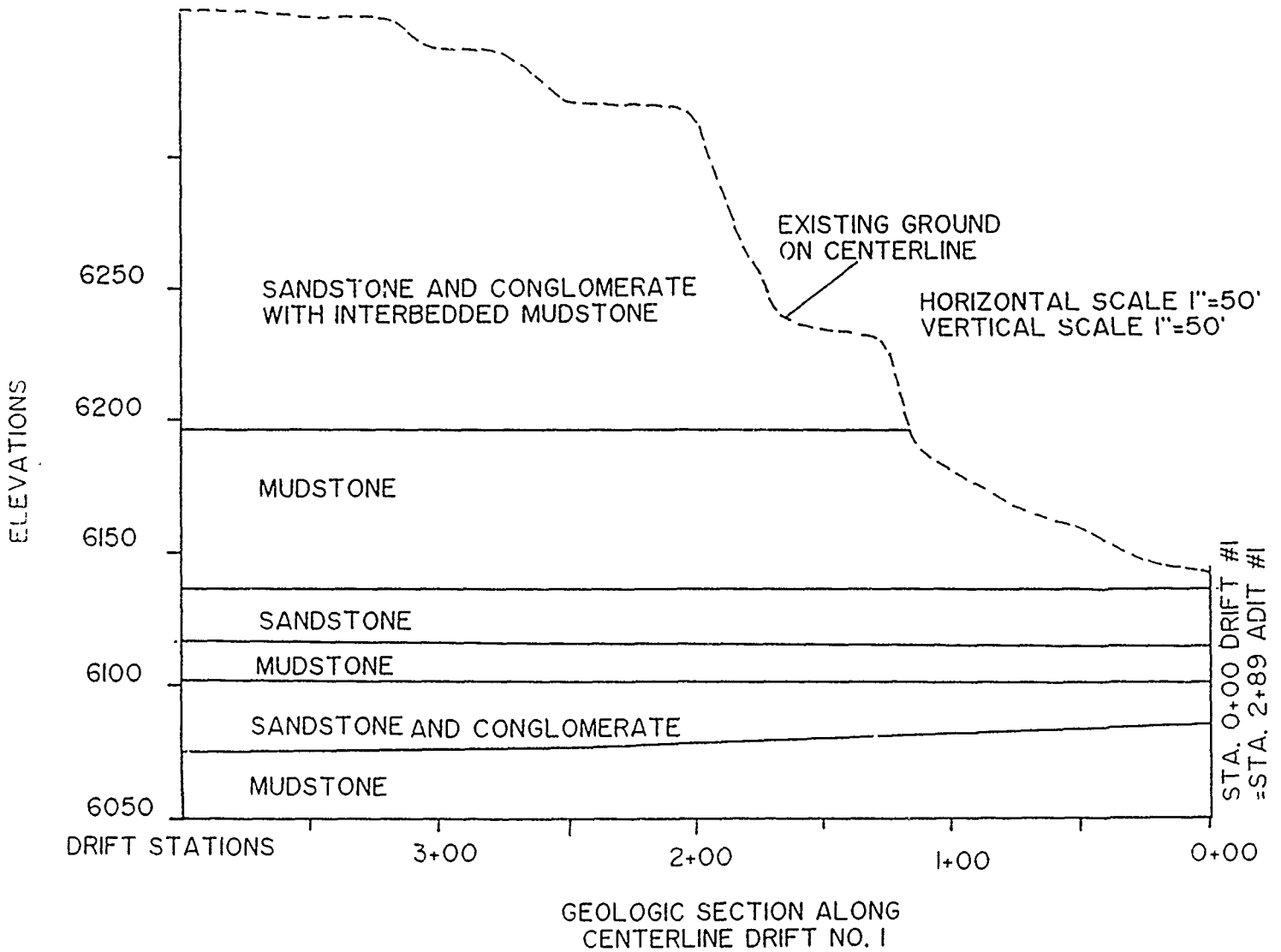
GEOLOGIC SECTIONS ALONG ADITS AND DRIFTS


EXISTING GROU
ON CENTERLIN
SANDSTONE AND CONGLOMERATE
WITH INTERBEDDED MUDSTONE
6250
6200
SANDSTONE
6150
MUDSTONE
SANDSTONE
6100
MUDSTONE
SANDSTONE AND CONGLOMERATE
6050
MUDSTONE
ELEVATIONS
ADIT STATIONS
10+00
9+00
8+00
7+00
GEOLOGIC SECTION
CENTERLINE ADI
HORIZONTAL SCALE
VERTICAL SCALE 1"

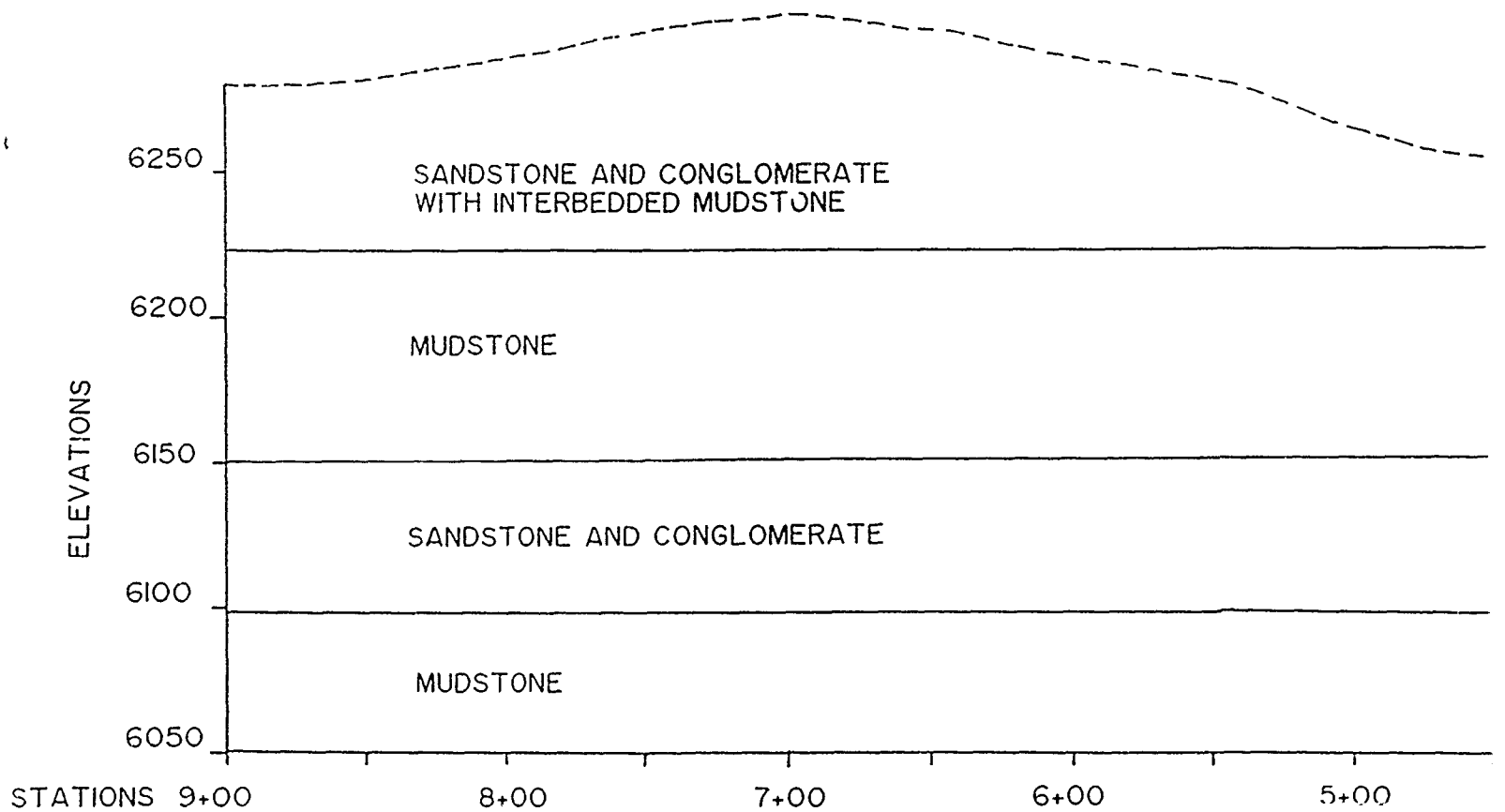


GIC SECTION ALONG
TERLINE ADIT NO.1

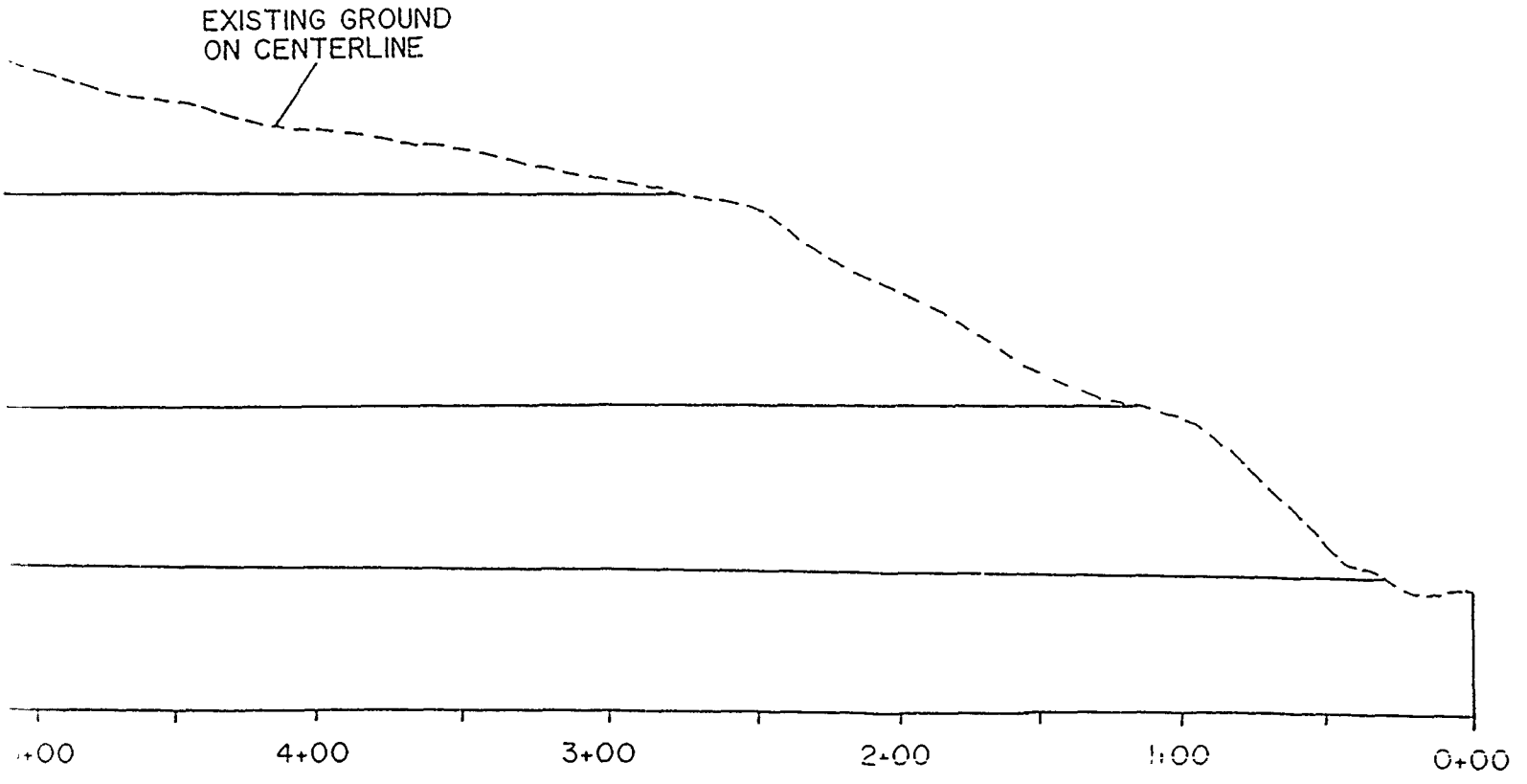
NTAL SCALE 1"=50'
AL SCALE 1"=50'



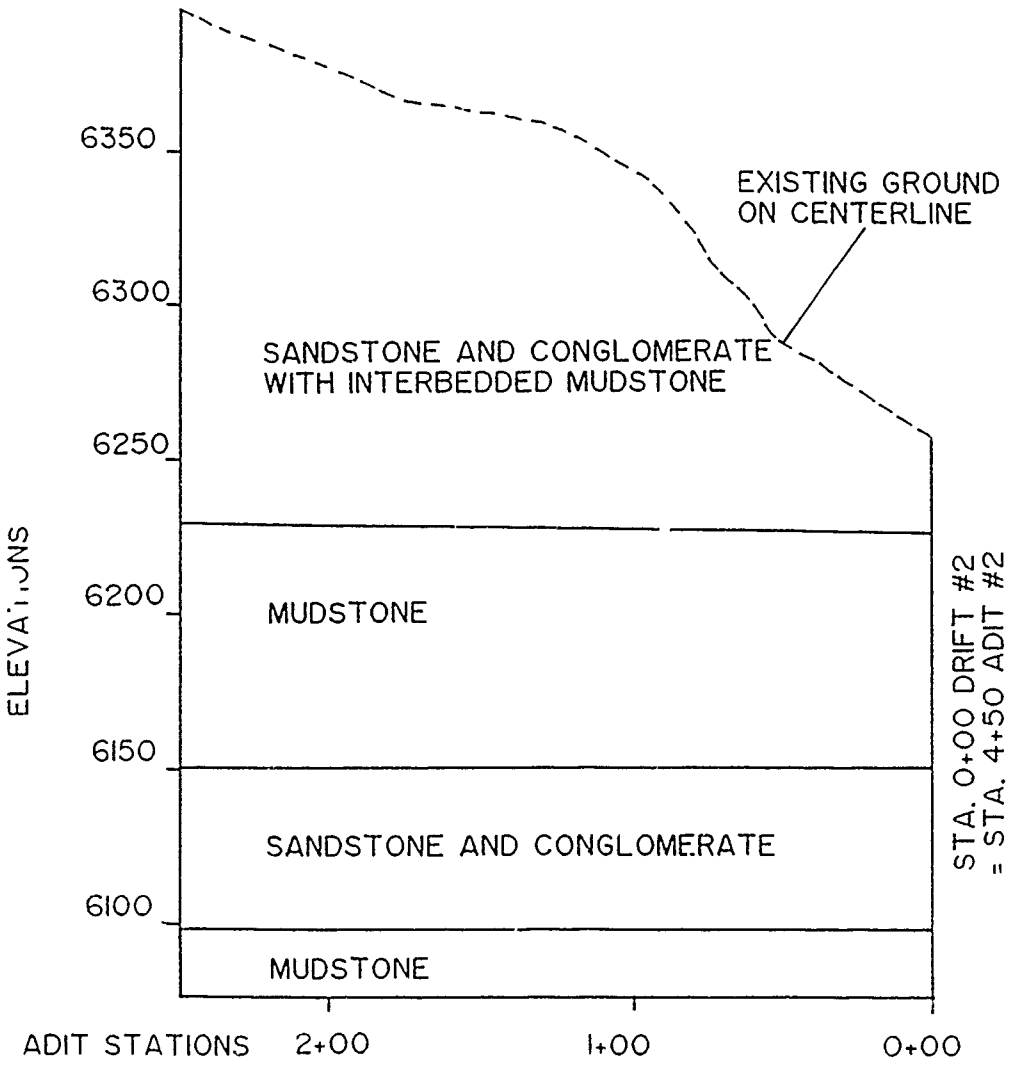
GEOLOGIC SECTION ALONG
CENTERLINE DRIFT NO. 1



GEOLOGIC SECTION ALONG
CENTERLINE ADIT NO. 2
HORIZONTAL SCALE:1"=50'
VERTICAL SCALE 1"=50'



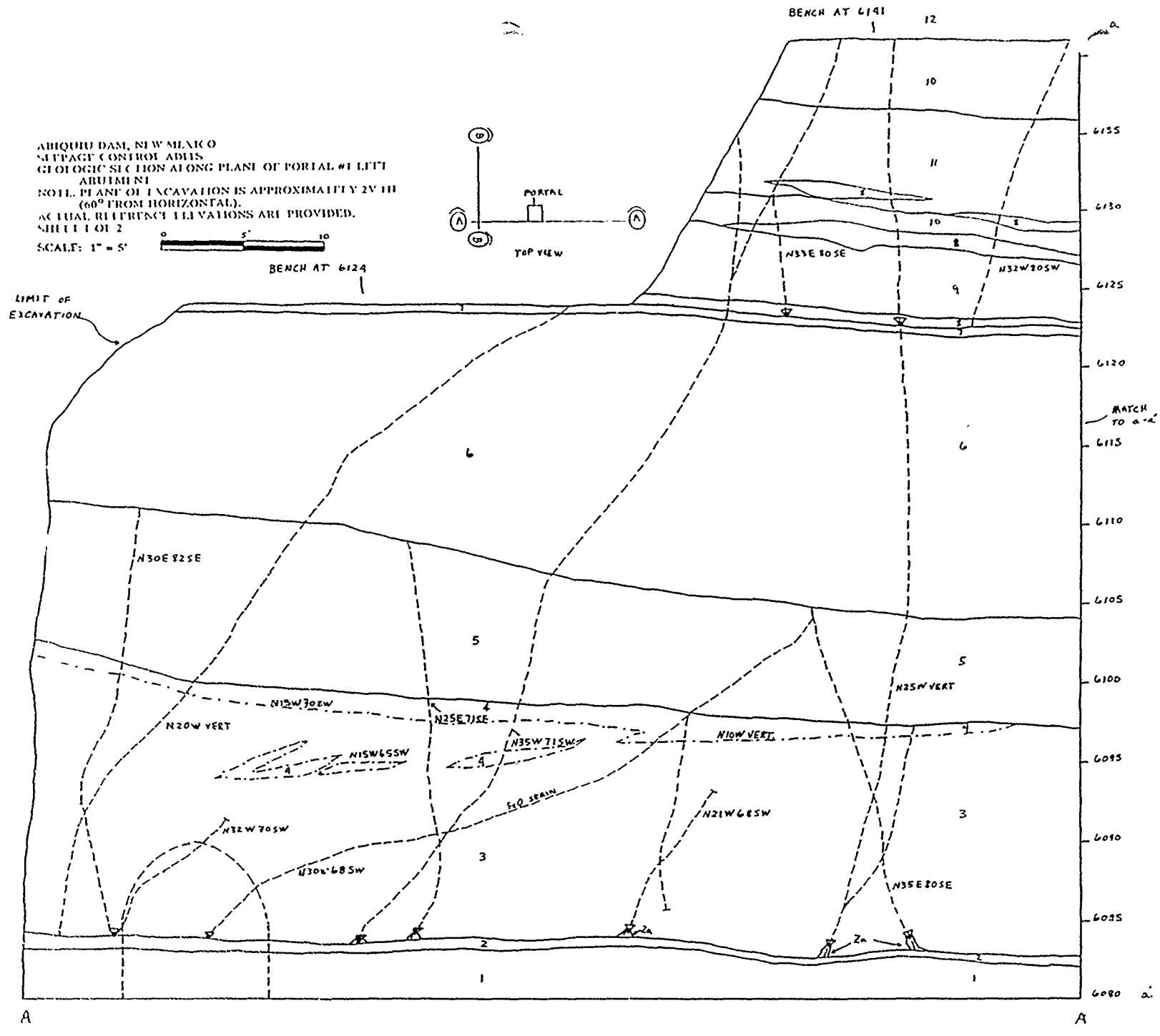
TION ALONG
DIT NO. 2
CALE:1"=50'
LE 1"=50'



GEOLOGIC SECTION ALONG
CENTERLINE DRIFT NO. 2
HORIZONTAL SCALE: 1"=50'
VERTICAL SCALE: 1"=50'

APPENDIX 7

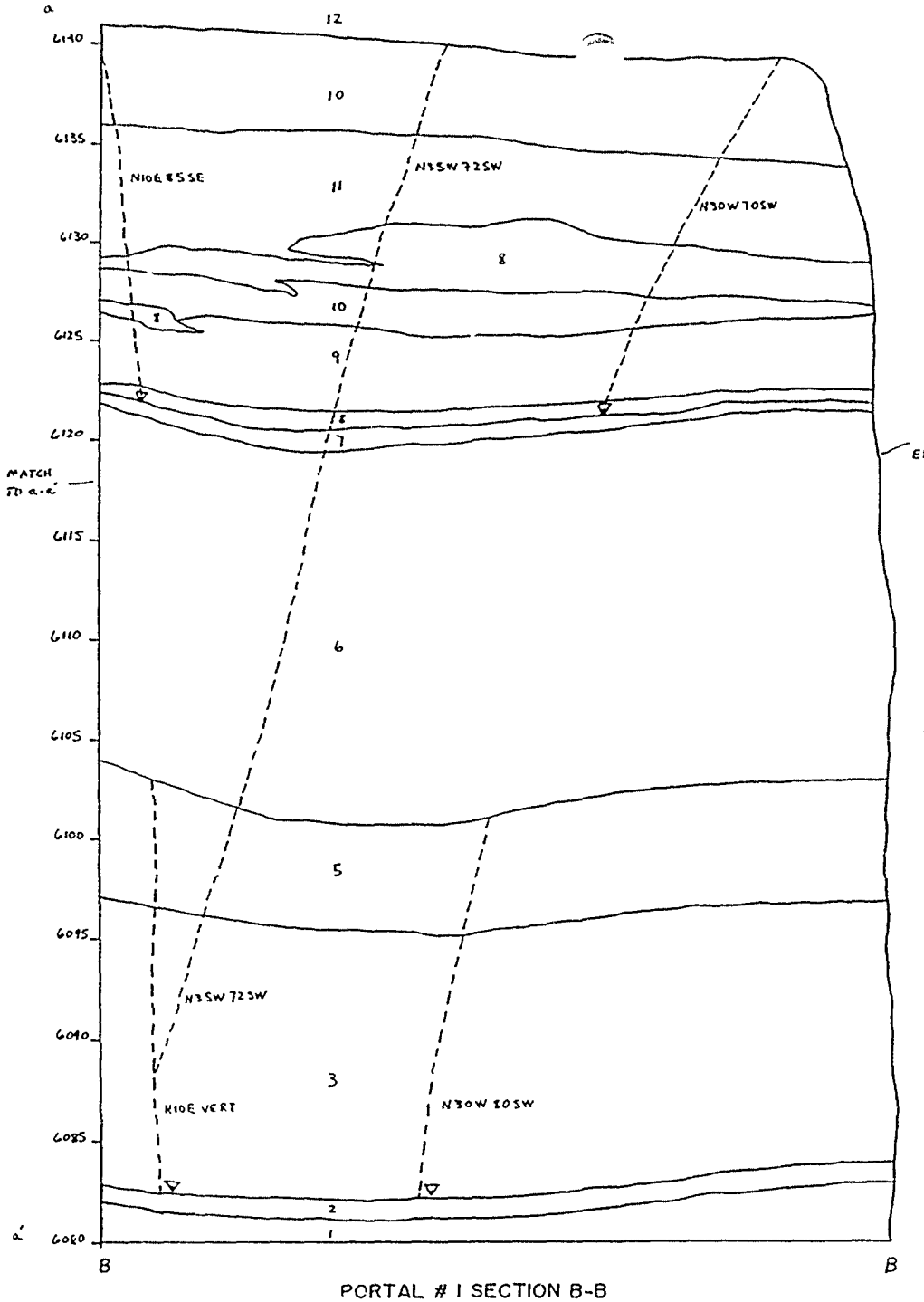
MAPS OF PORTAL FACES, ADITS AND DRIFTS



PORTAL #1 SECTION A-A

NOTE: FACE STRIKES N10W

ABIQUIU DAM, NEW MEXICO
SEEPAGE CONTROL ADITS
GEOLOGIC SECTION ALONG PLANE OF PORTAL #1
SHEET 2 OF 2



PORTAL # 1 SECTION B-B

NOTE: FACE STRIKES N80E

EXPLANATION

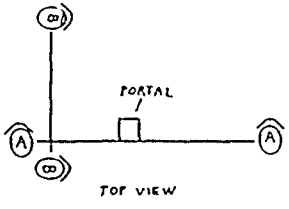
CONTACT BETWEEN MAPPED ROCK UNITS.

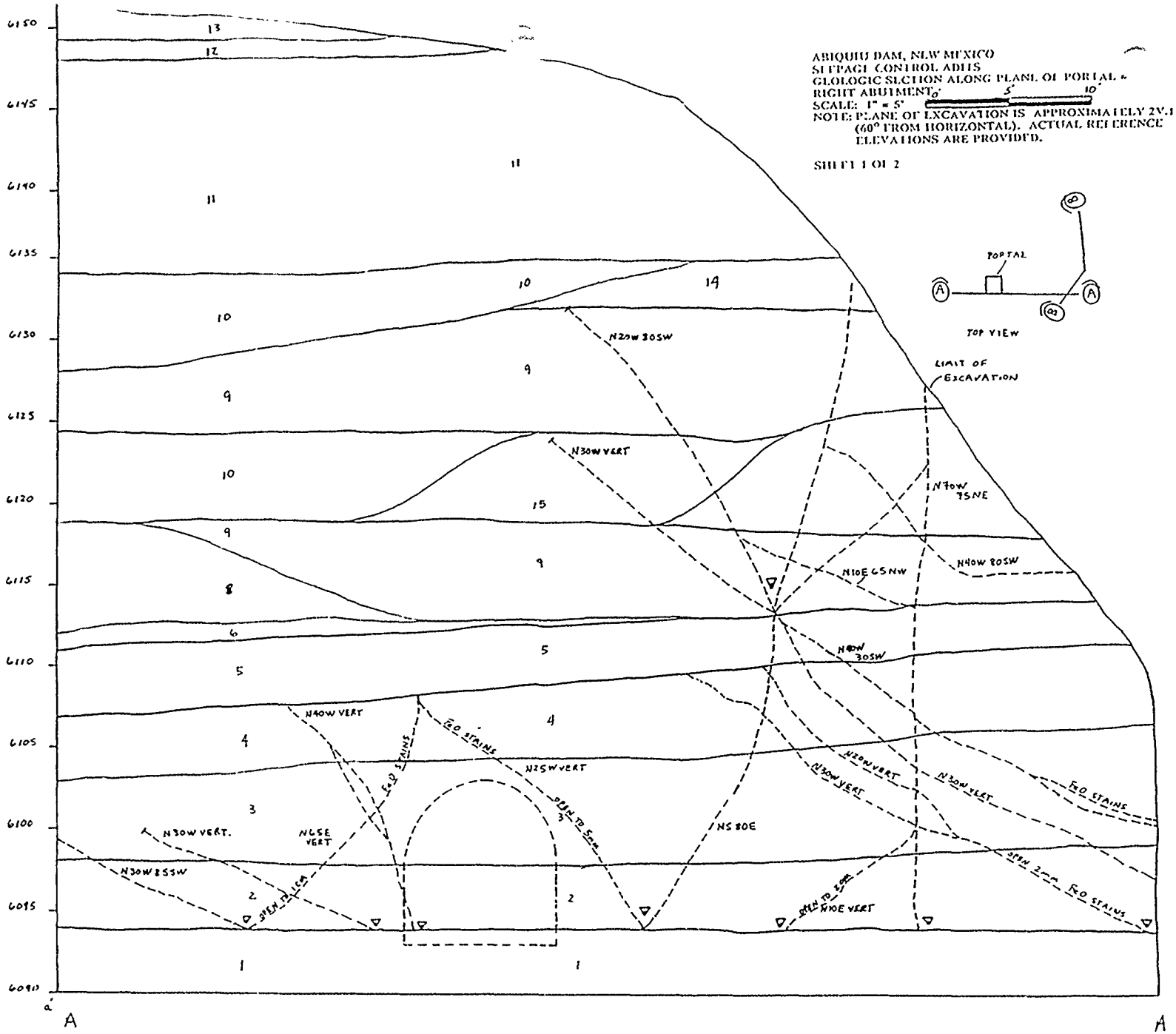
JOINTS WHICH EXTEND THROUGH MORE THAN ONE MAPPED ROCK UNIT. STRIKE, DIP AND OTHER CHARACTERISTICS OF EACH JOINT ARE INCLUDED.

3 MAPPED ROCK UNIT, NUMBER CORRESPONDS TO ATTACHED LITHOLOGIC DESCRIPTIONS.

WATER SEEPAGE.

AREA WITH JOINT SURFACE EXPOSED RUNNING PARALLEL TO PORTAL FACE WITH FeO STAIN.

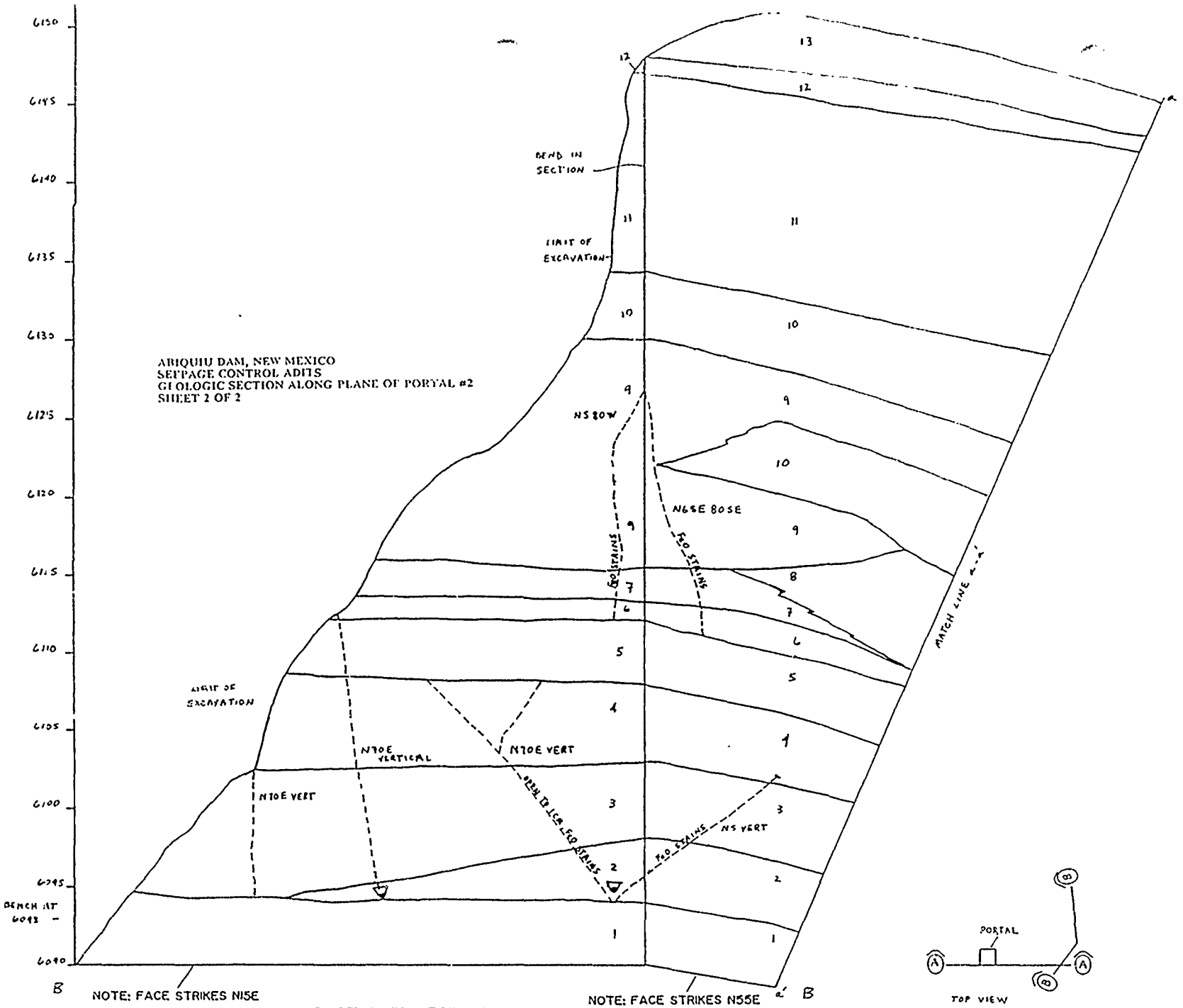




PORTAL #2 SECTION A - A

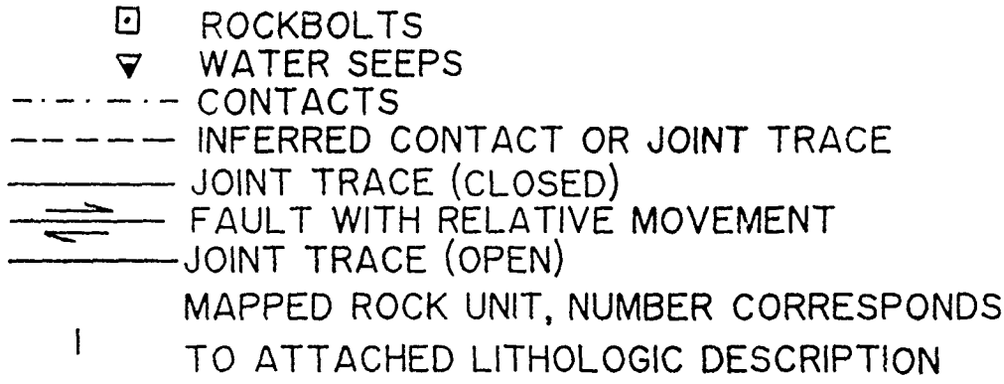
NOTE: FACE STRIKES N70W

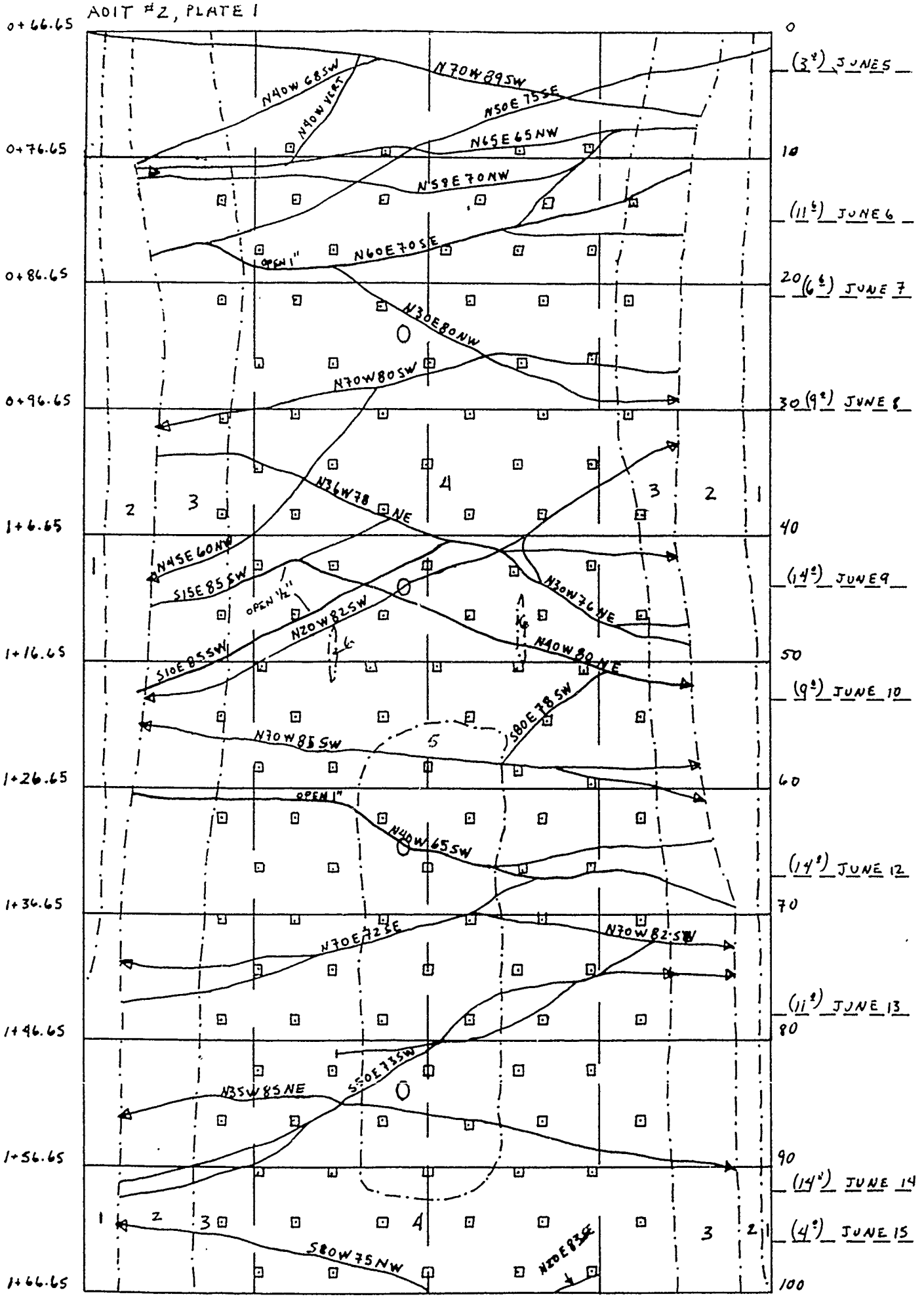
ABIQUIU DAM, NEW MEXICO
SEEPAGE CONTROL ADITS
GEOLOGIC SECTION ALONG PLANE OF PORTAL #2
SHEET 2 OF 2



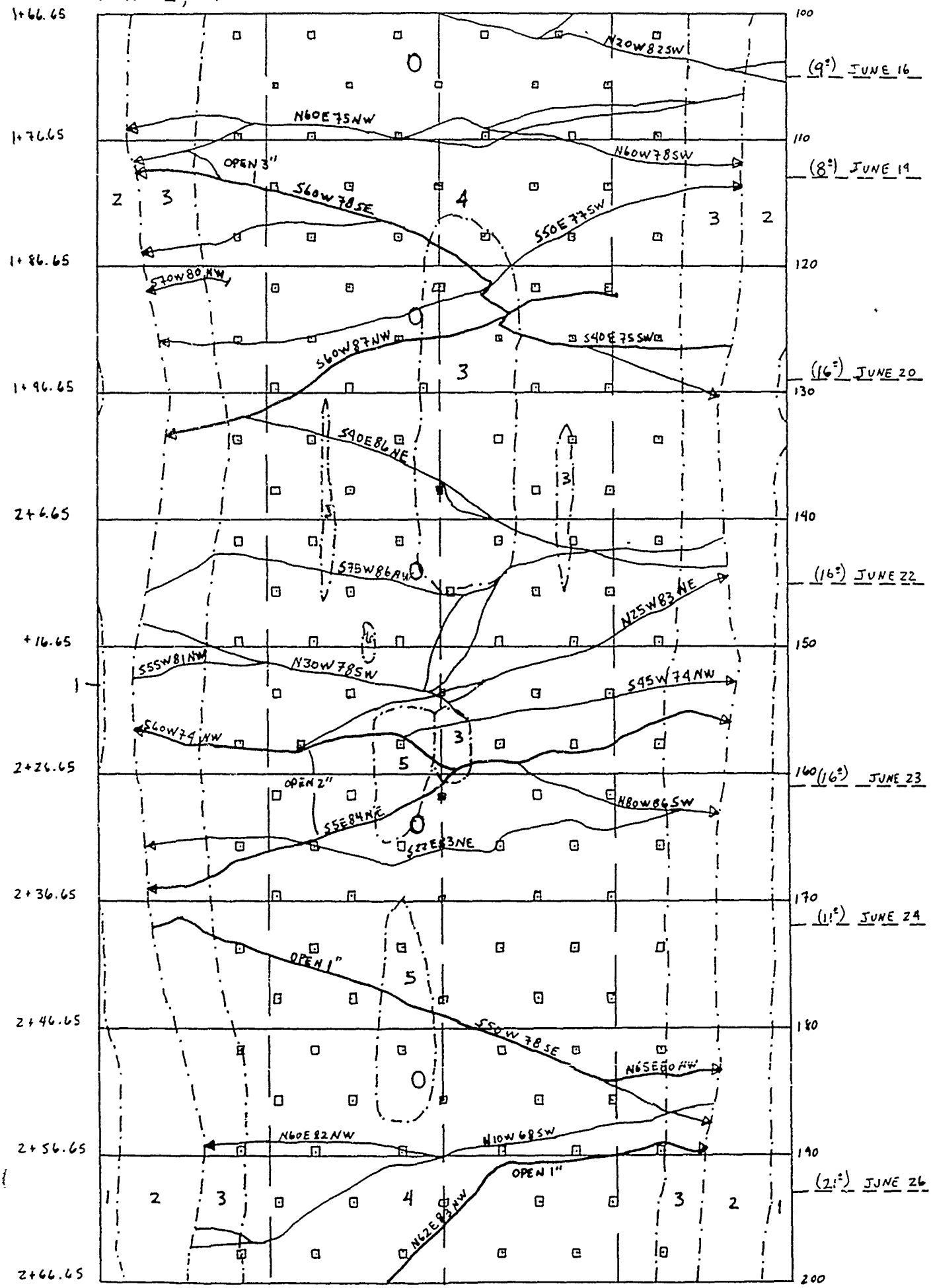
PORTAL #2 SECTION B-B

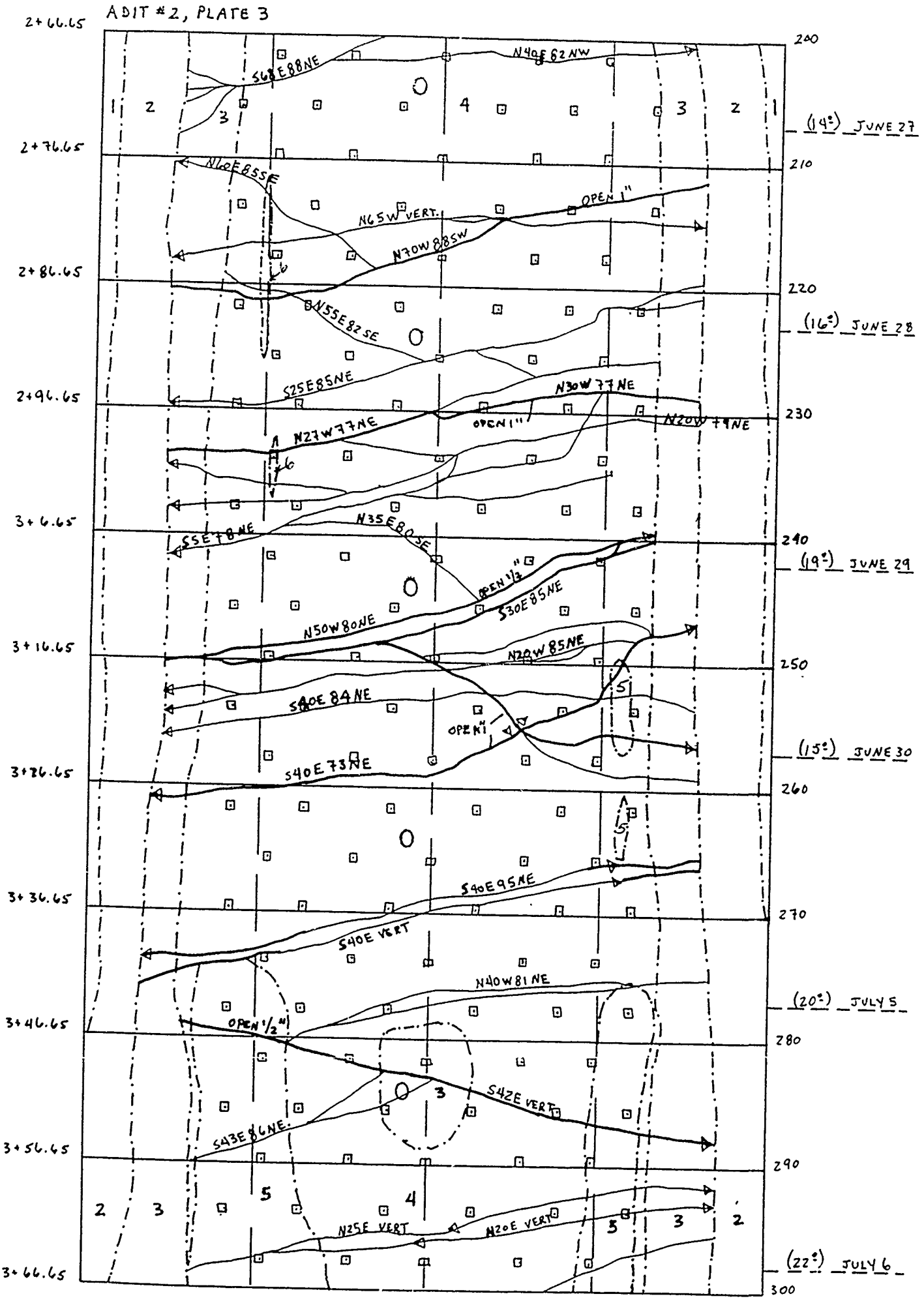
LEGEND

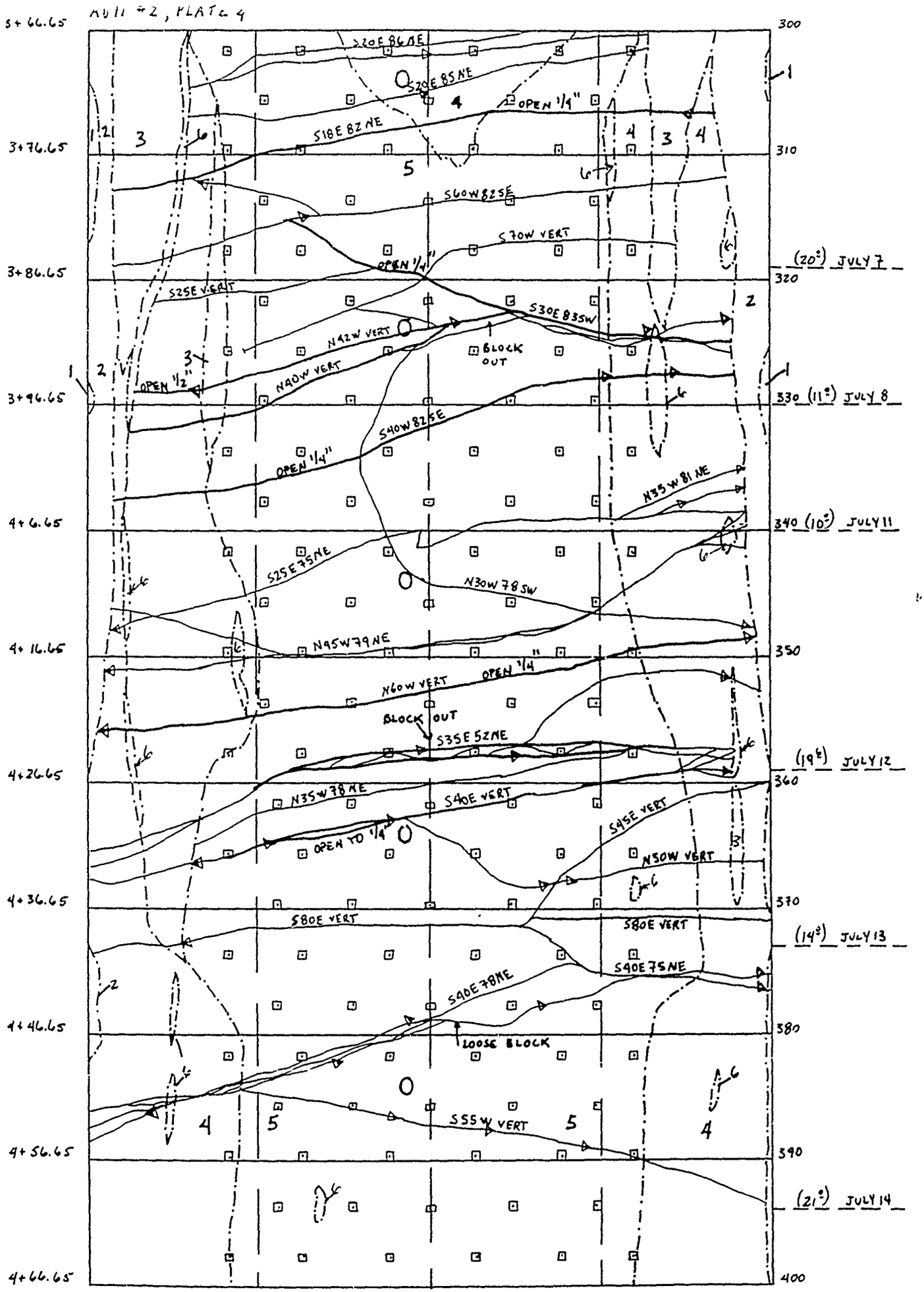

ROCKBOLTS
WATER SEEPS
CONTACTS
INFERRED CONTACT OR JOINT TRACE
JOINT TRACE (CLOSED)
FAULT WITH RELATIVE MOVEMENT
JOINT TRACE (OPEN)
MAPPED ROCK UNIT, NUMBER CORRESPONDS
TO ATTACHED LITHOLOGIC DESCRIPTION


ADIT #2, PLATE 1
0+66.65
0+76.65
0+86.65
0+96.65
1+6.65
1+16.65
1+26.65
1+36.65
1+46.65
1+56.65
1+66.65
0
10
20
30
40
50
60
70
80
90
100
(3d) JUNE 5
(11d) JUNE 6
(6d) JUNE 7
(9d) JUNE 8
(14d) JUNE 9
(9d) JUNE 10
(14d) JUNE 12
(11d) JUNE 13
(14d) JUNE 14
(4d) JUNE 15
N40W 68SW
N40W VERT
N70W 89SW
N50E 75SE
N65E 65NW
N59E 70NW
OPEN 1"
N60E 70SE
N30E 80NW
N70W 80SW
N36W 78 NE
N45E 60NW
S15E 85SW
OPEN 1/2"
N20W 82SW
N30W 76NE
S10E 85SW
N40W 80NE
S80E 78SW
N70W 85SW
OPEN 1"
N40W 65SW
N70E 72SE
N70W 82SW
N35W 85NE
S50E 73SW
S80W 75NW
N20E 82SE

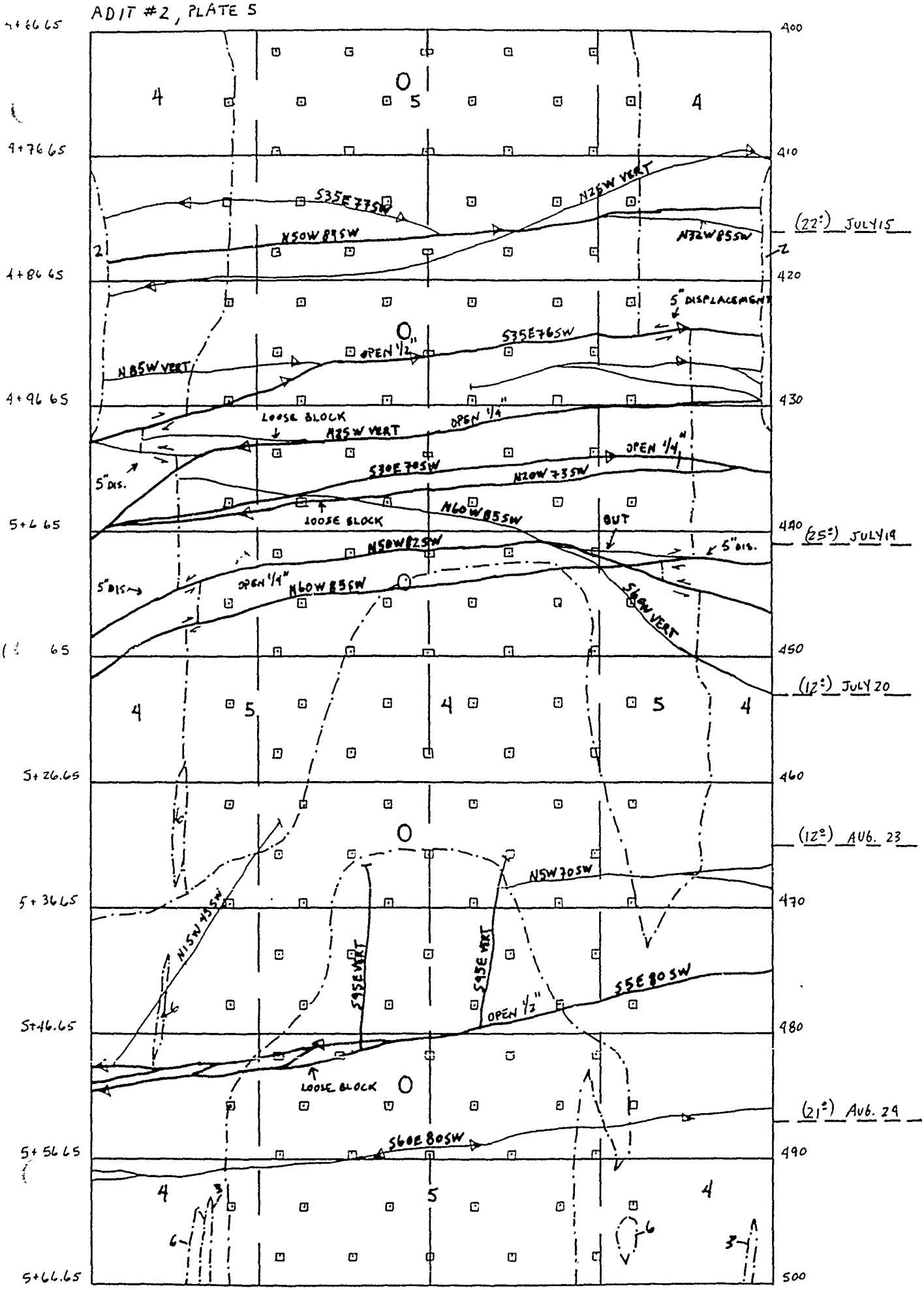
ADIT #2, PLATE 2

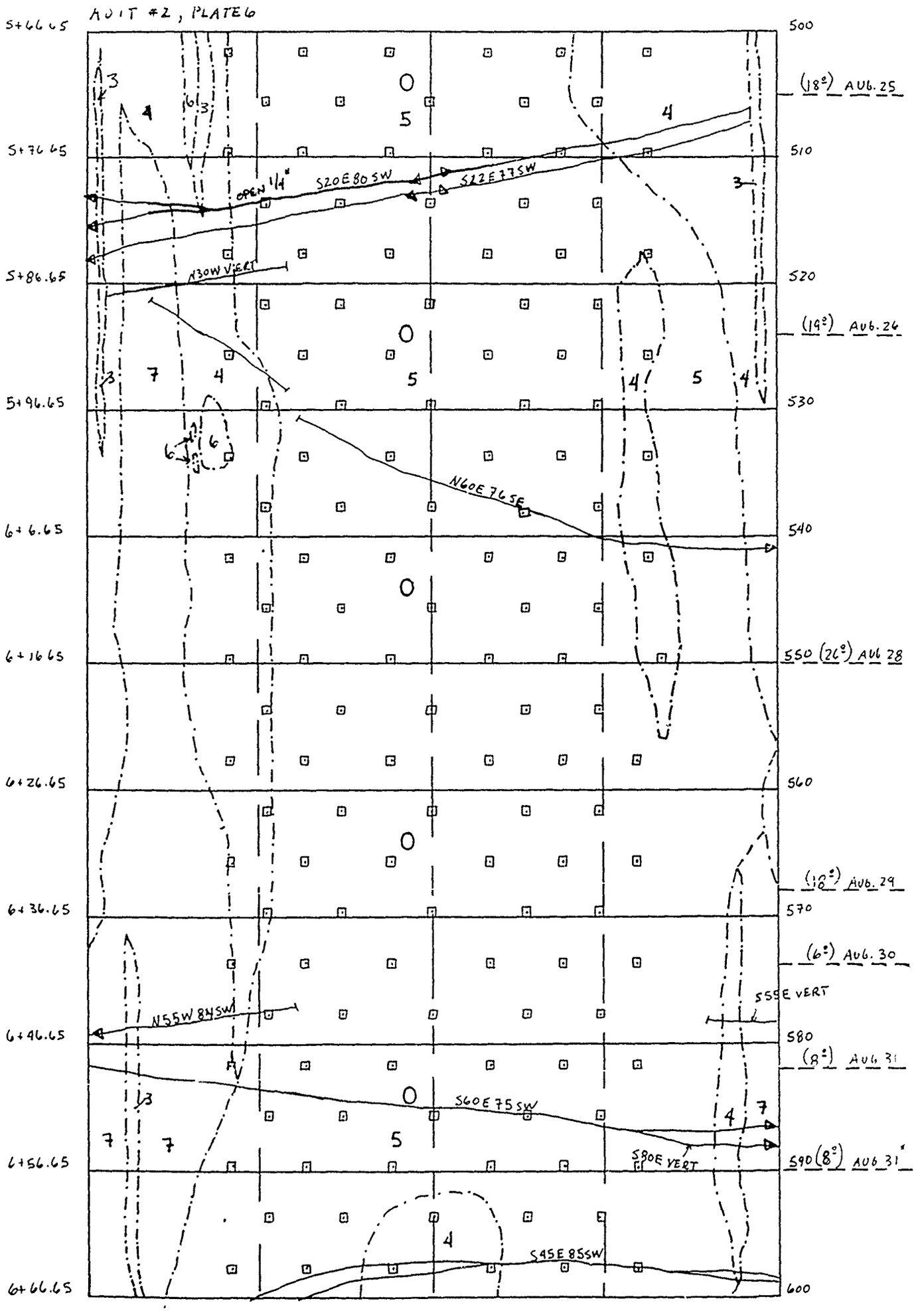


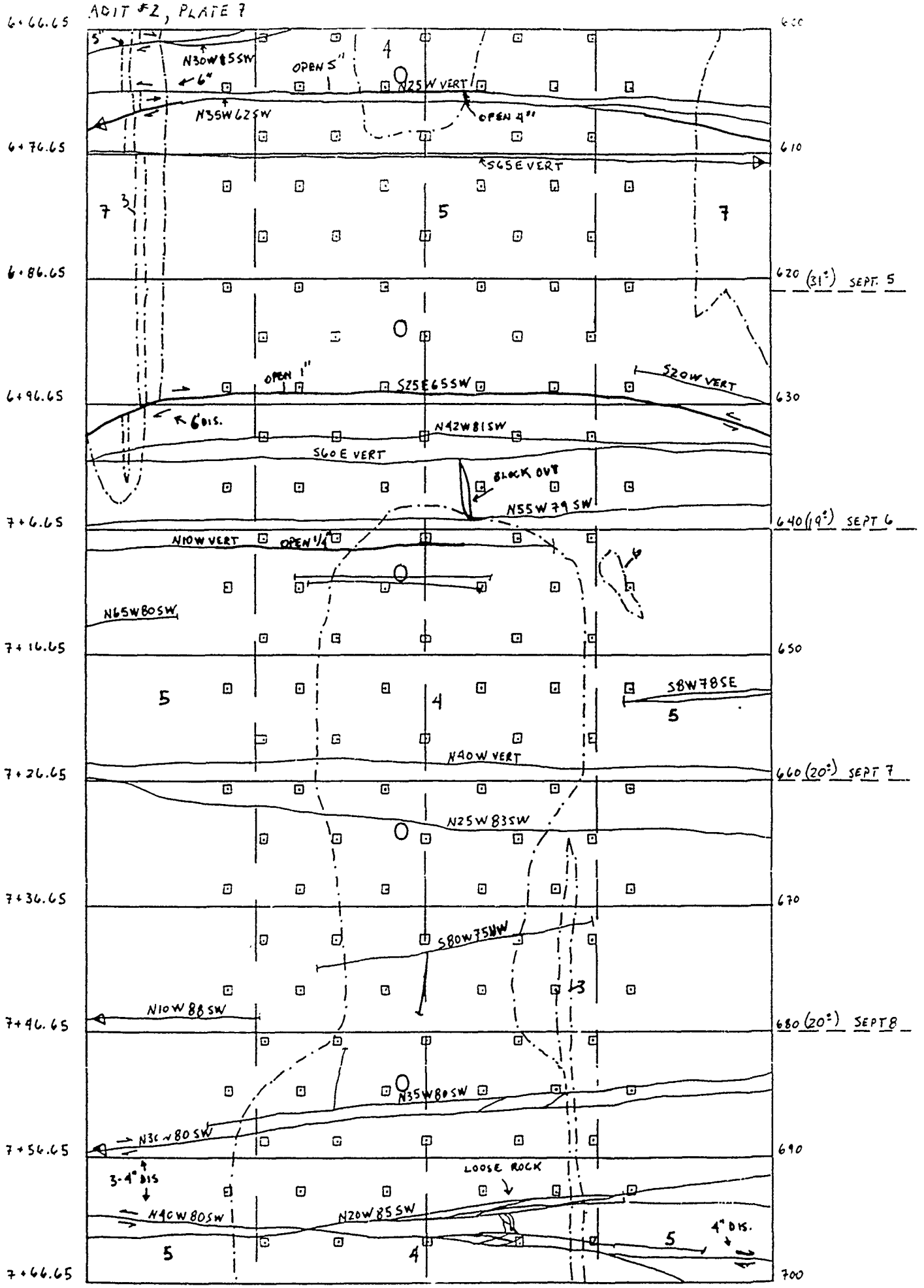

ADIT #2, PLATE 3
2+66.65
2+76.65
2+86.65
2+96.65
3+6.65
3+16.65
3+26.65
3+36.65
3+46.65
3+56.65
3+66.65
S68E88NE
N40E82NW
N16E85SE
N65W VERT.
OPEN 1"
N70W88SW
N55E82SE
S25E85NE
N30W77NE
N27W77NE
OPEN 1"
N20W79NE
N35E80SE
S5E78NE
OPEN 1/2"
S30E85NE
N50W80NE
N20W85NE
S40E84NE
OPEN 1"
S40E73NE
S40E95NE
S40E VERT
N40W81NE
OPEN 1/2"
S42E VERT
S43E86NE
N25E VERT
N20E VERT
240
210
220
230
240
250
260
270
280
290
300
(14°) JUNE 27
(16°) JUNE 28
(19°) JUNE 29
(15°) JUNE 30
(20°) JULY 5
(22°) JULY 6

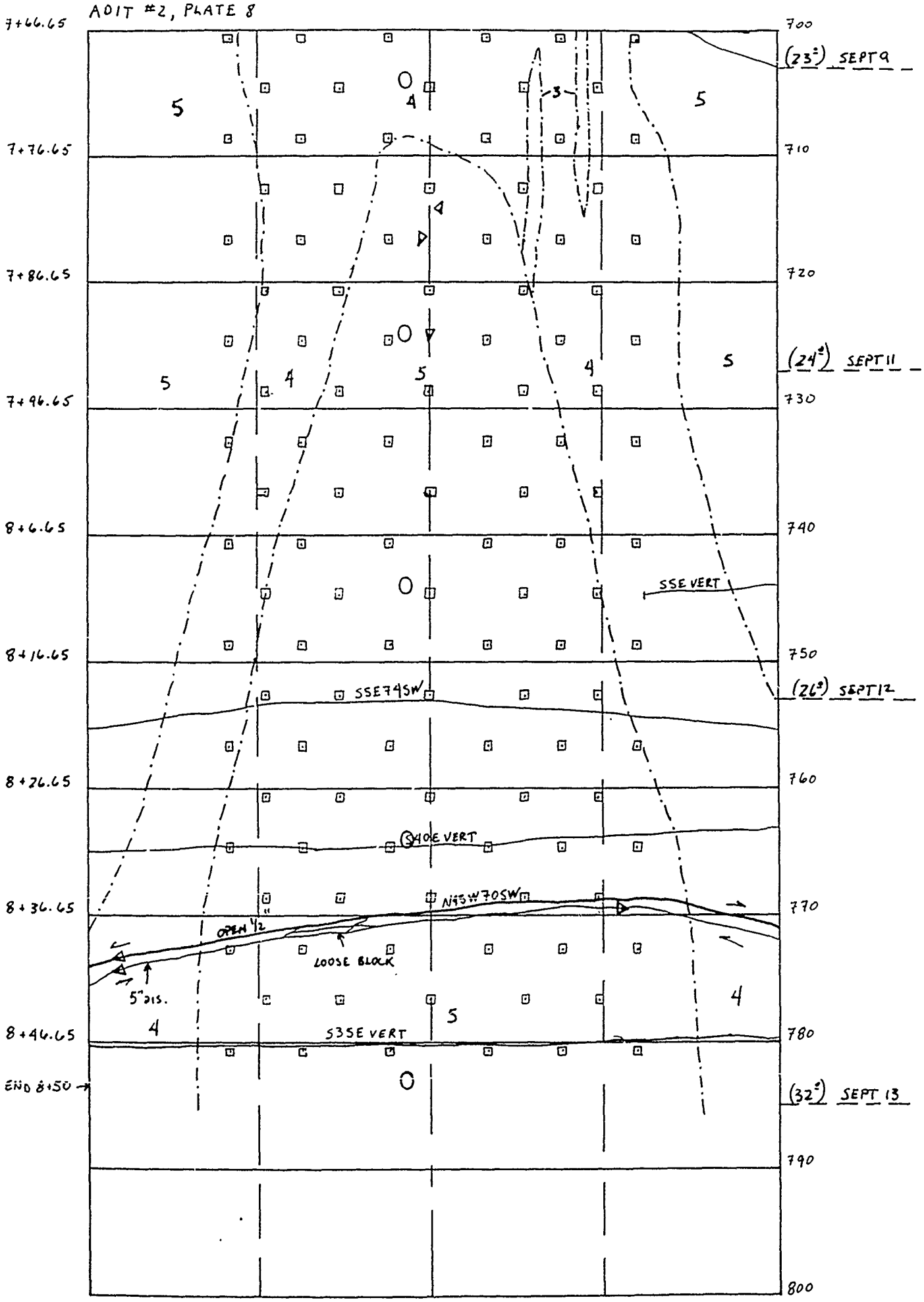

MILL #2, PLAT 4
5+66.65
3+76.65
3+86.65
3+96.65
4+6.65
4+16.65
4+26.65
4+36.65
4+46.65
4+56.65
4+66.65
300
310
320
330
340
350
360
370
380
390
400
(20°) JULY 7
(11°) JULY 8
(10°) JULY 11
(19°) JULY 12
(14°) JULY 13
(21°) JULY 14
S20E 86NE
S20E 85NE
OPEN 1/4"
S18E 82NE
S60W 82SE
S70W VERT
OPEN 1/4"
S25E VERT
S30E 83SW
N42W VERT
BLOCK OUT
OPEN 1/2"
N40W VERT
S40W 82SE
OPEN 1/4"
N35W 81NE
S25E 75NE
N30W 78SW
N95W 79NE
N60W VERT
OPEN 1/4"
BLOCK OUT
S35E 52NE
N35W 78NE
S40E VERT
OPEN TO 1/4"
S45E VERT
N50W VERT
S80E VERT
S80E VERT
S40E 75NE
S40E 78NE
LOOSE BLOCK
S55W VERT

ADIT #2, PLATE 5

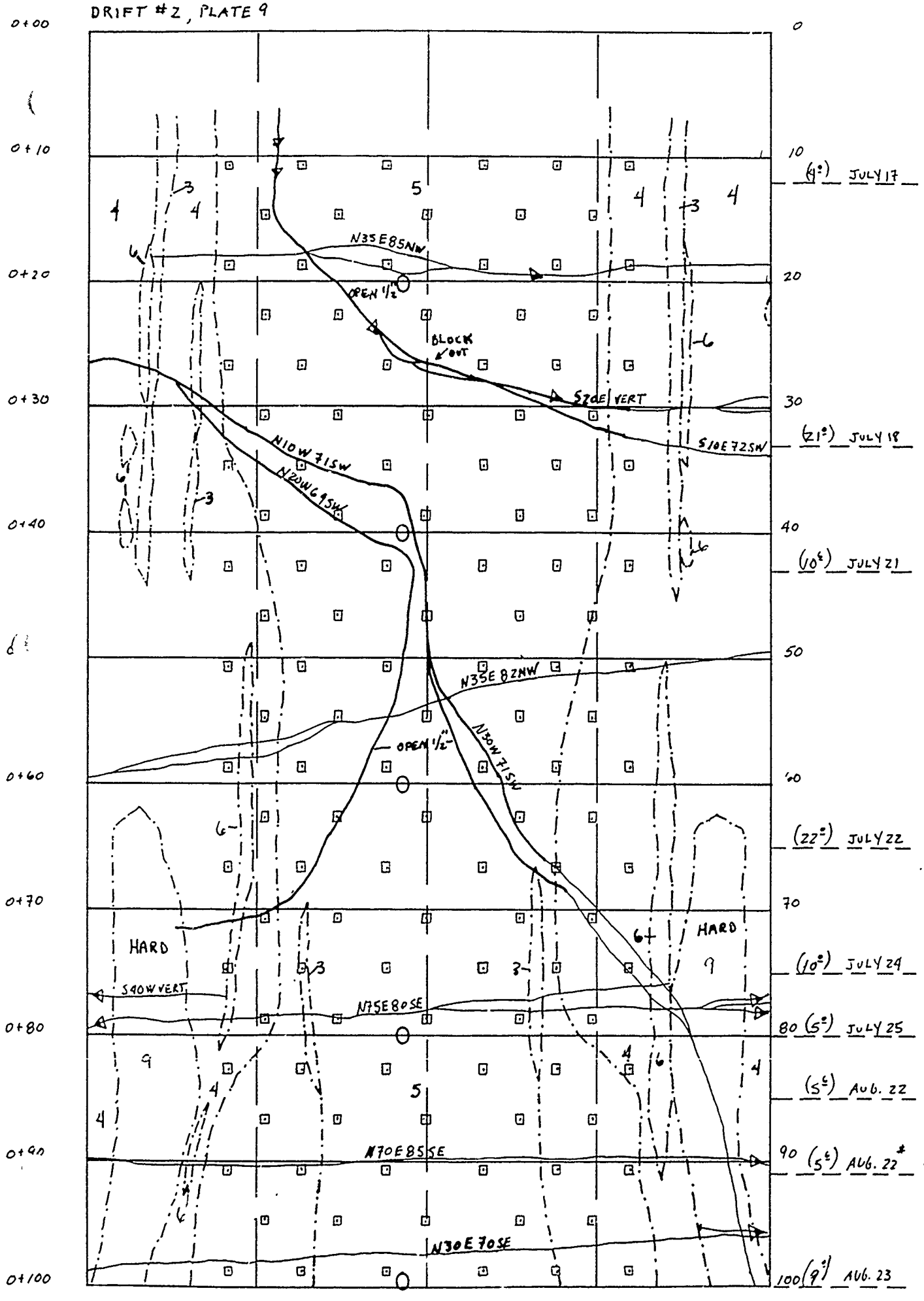



ADIT #2, PLATE 6
5+66.65
5+76.65
5+86.65
5+96.65
6+6.65
6+16.65
6+26.65
6+36.65
6+46.65
6+56.65
6+66.65
500
510
520
530
540
550
560
570
580
590
600
(18°) AU6.25
(19°) AU6.24
(18°) AU6.29
(6°) AU6.30
(8°) AU6.31
(8°) AU6.31
(26°) AU6.28
OPEN 1/4"
S20E80SW
S12E77SW
N30W VERT
N60E76SE
N55W84SW
S60E75SW
S80E VERT
S55E VERT
S45E85SW

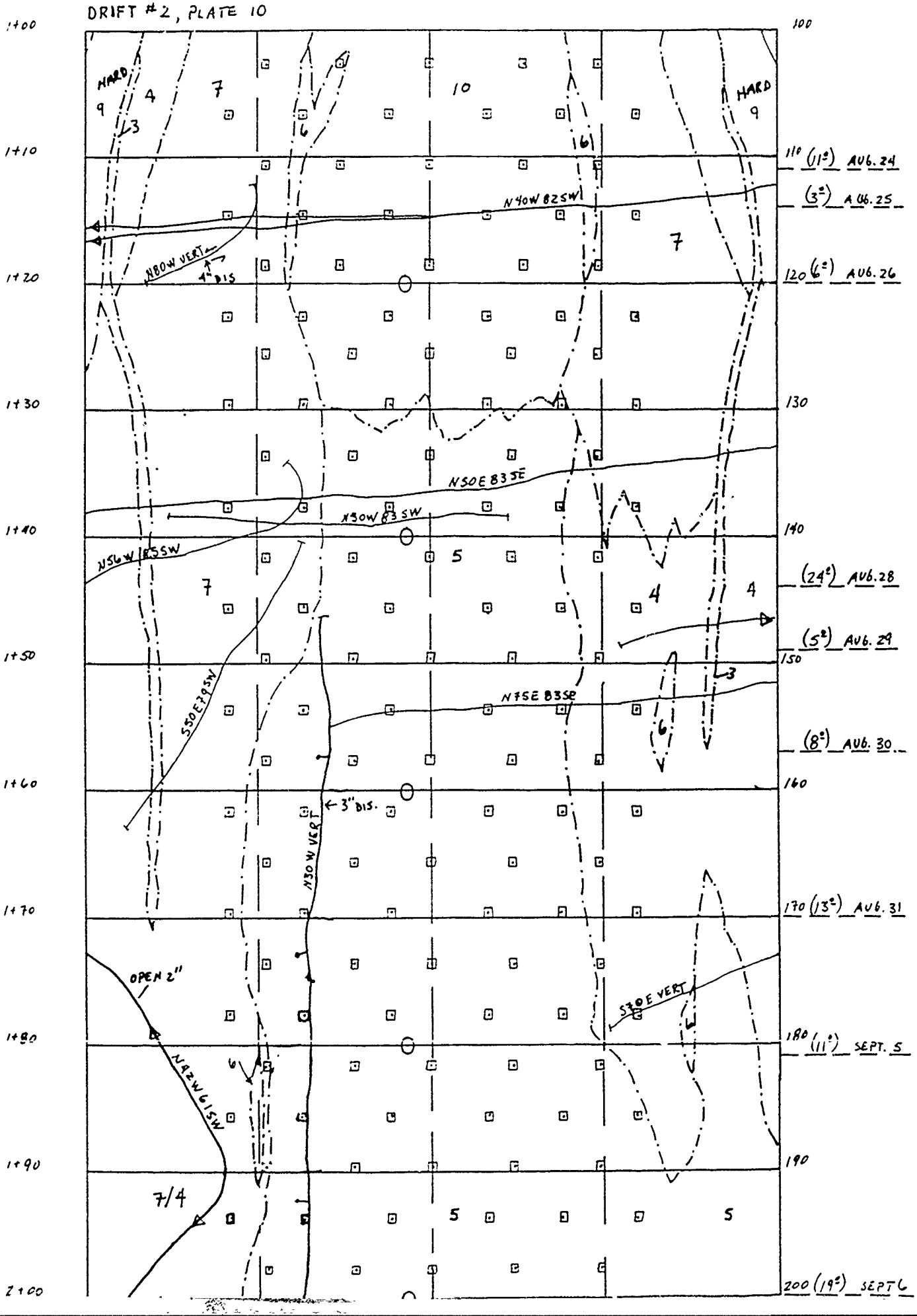

ADIT #2, PLATE 7
6+66.65
6+76.65
6+86.65
6+96.65
7+6.65
7+16.65
7+26.65
7+36.65
7+46.65
7+56.65
7+66.65
600
610
620 (31°) SEPT. 5
630
640 (19°) SEPT 6
650
660 (20°) SEPT 7
670
680 (20°) SEPT 8
690
700
5"
N30W85SW
6"
OPEN 5"
N25W VERT
N35W62SW
OPEN 4"
S65E VERT
OPEN 1"
S25E65SW
S20W VERT
6" DIS.
N42W81SW
S60E VERT
BLOCK OUT
N55W79SW
N10W VERT
OPEN 1/4"
N65W80SW
S8W78SE
N40W VERT
N25W83SW
S80W75NW
N10W88SW
N35W80SW
N36W80SW
3-4" DIS
N40W80SW
LOOSE ROCK
N20W85SW
4" DIS.


ADIT #2, PLATE 8
7+66.65
7+76.65
7+86.65
7+96.65
8+6.65
8+16.65
8+26.65
8+36.65
8+46.65
END 8+50
700
710
720
730
740
750
760
770
780
790
800
(23°) SEPT 9
(24°) SEPT 11
(26°) SEPT 12
(32°) SEPT 13
SSE VERT
SSE 79 SW
S40E VERT
N45W 70SW
OPEN 1/2"
LOOSE BLOCK
5" DIS.
S35E VERT

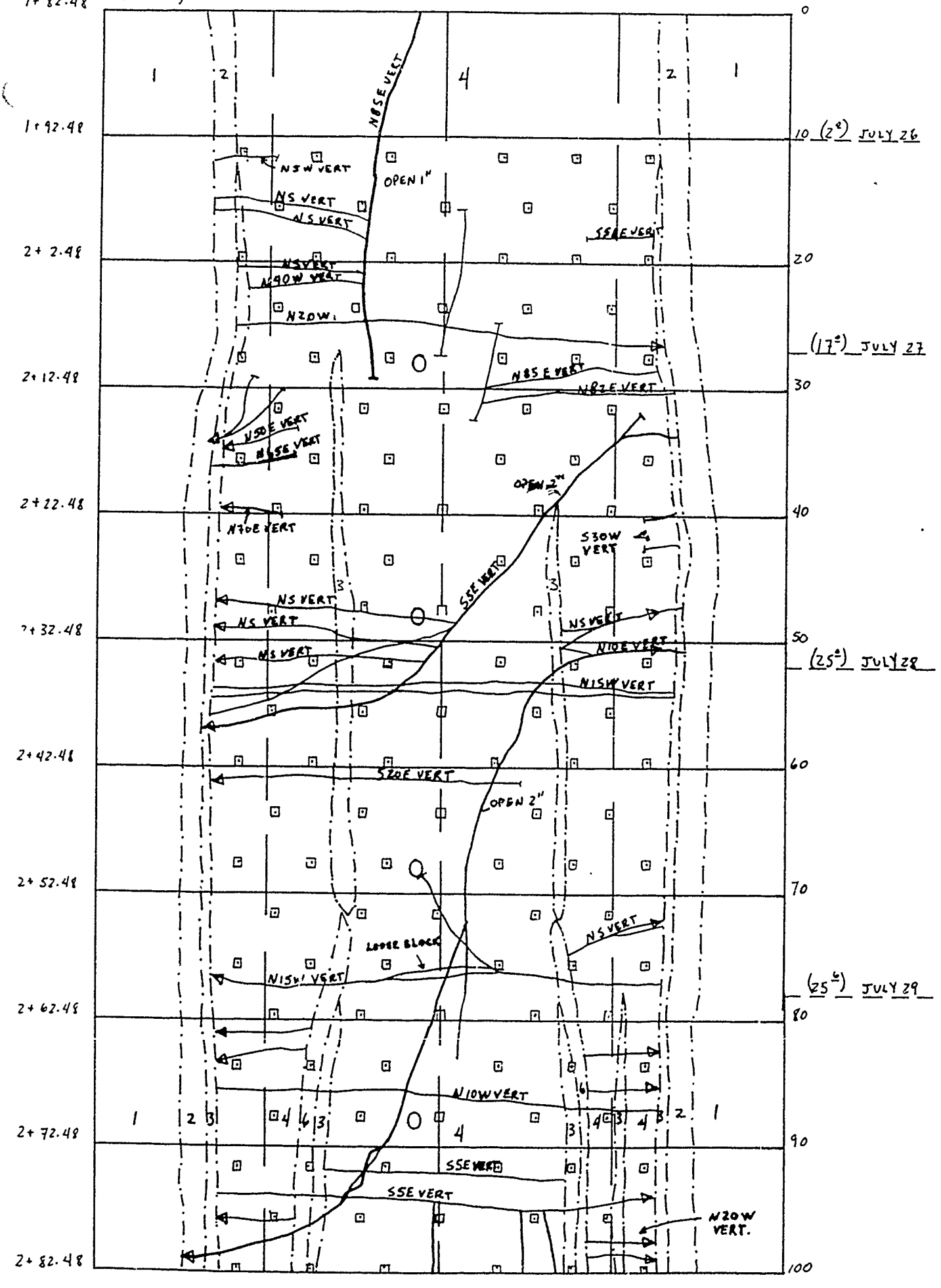
DRIFT #2, PLATE 9



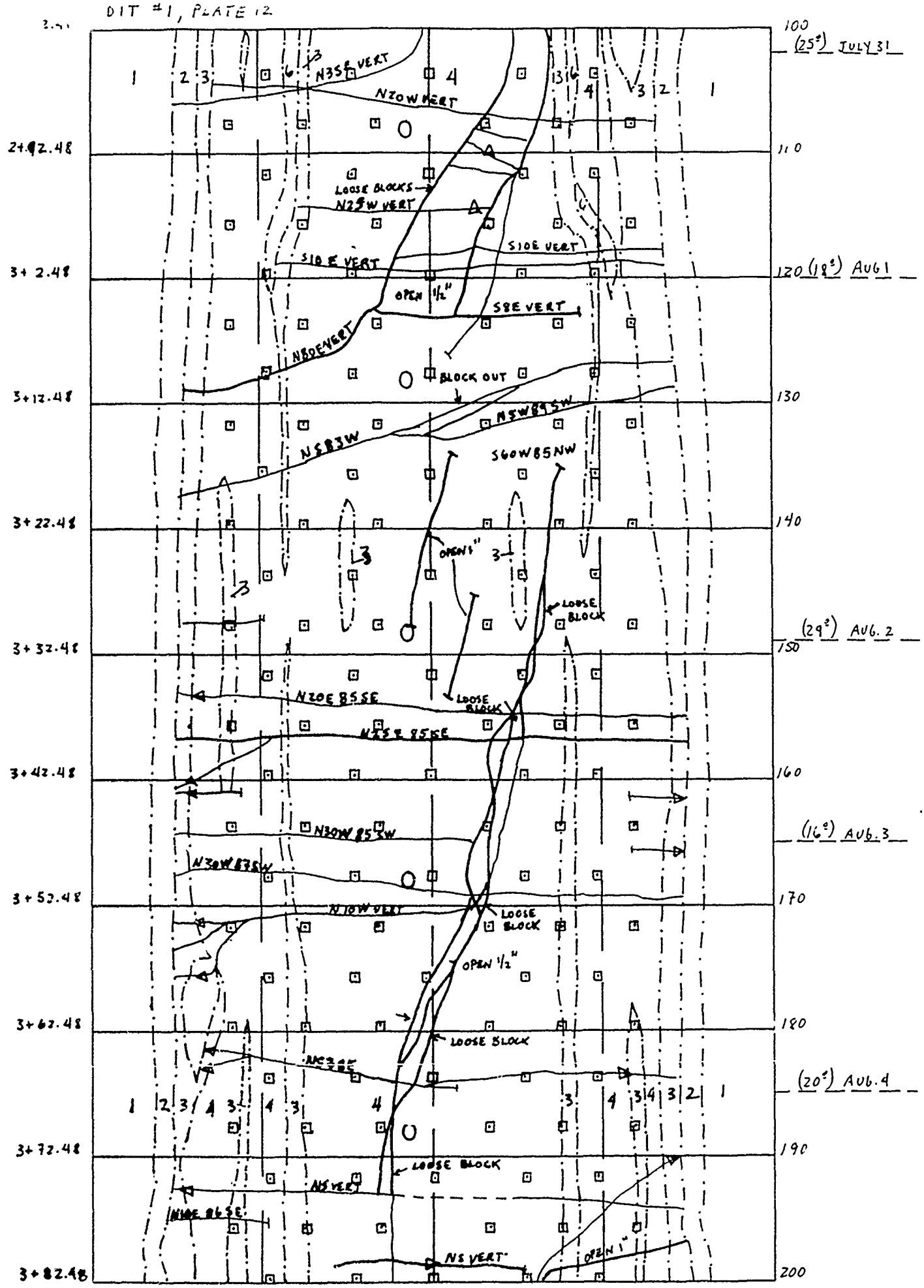
DRIFT #2, PLATE 10



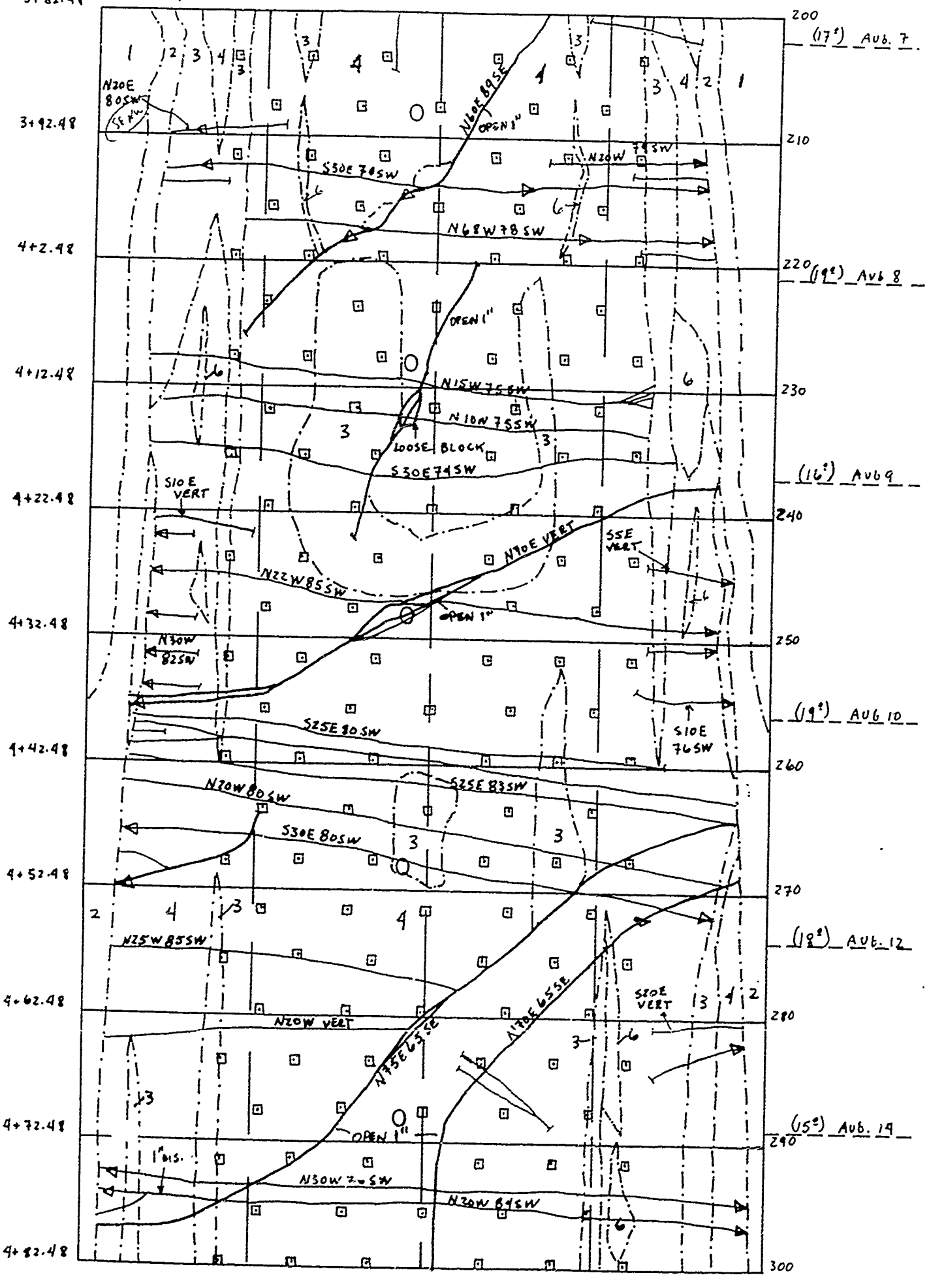
ADIT #1, PLATE II

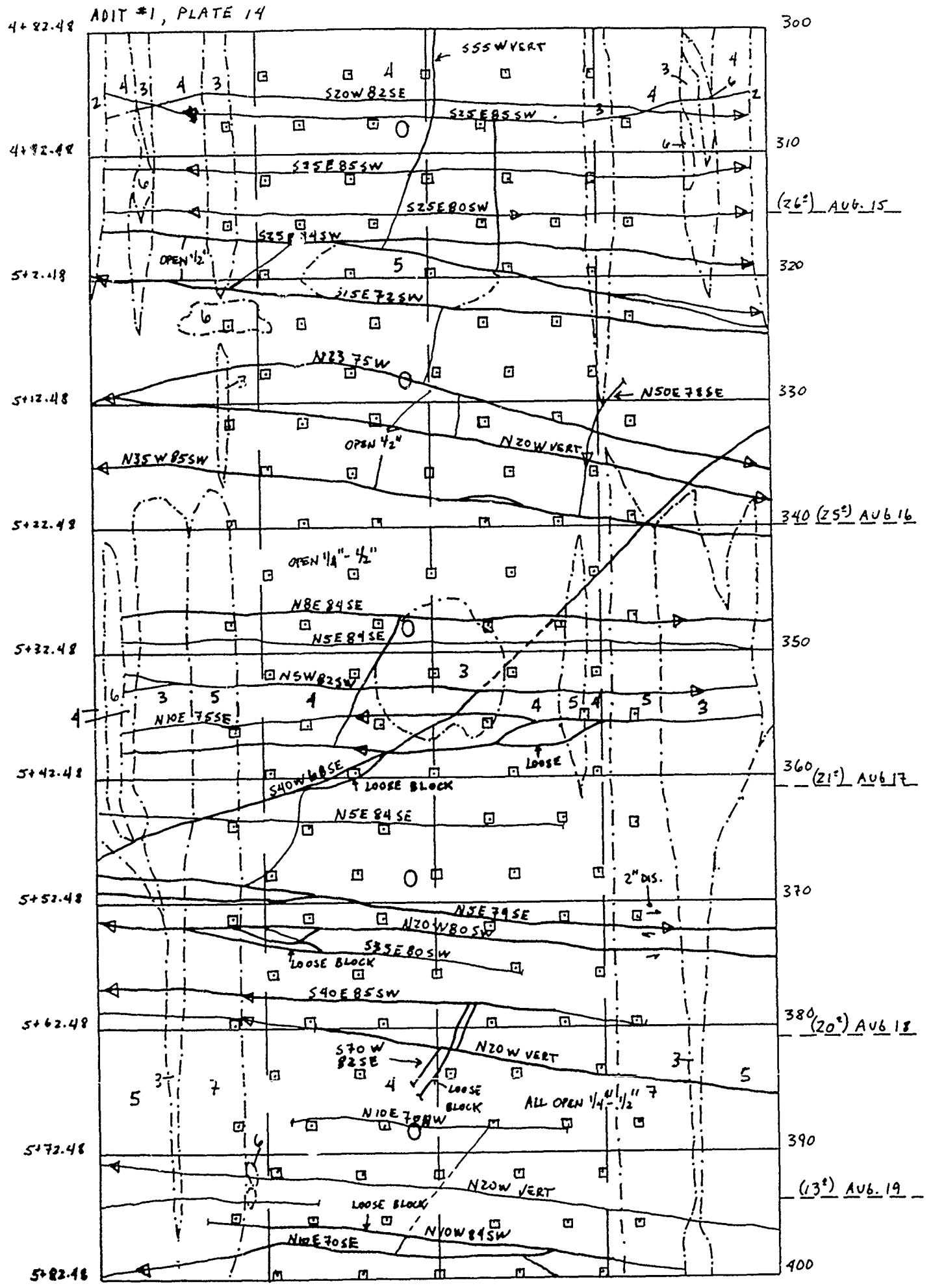


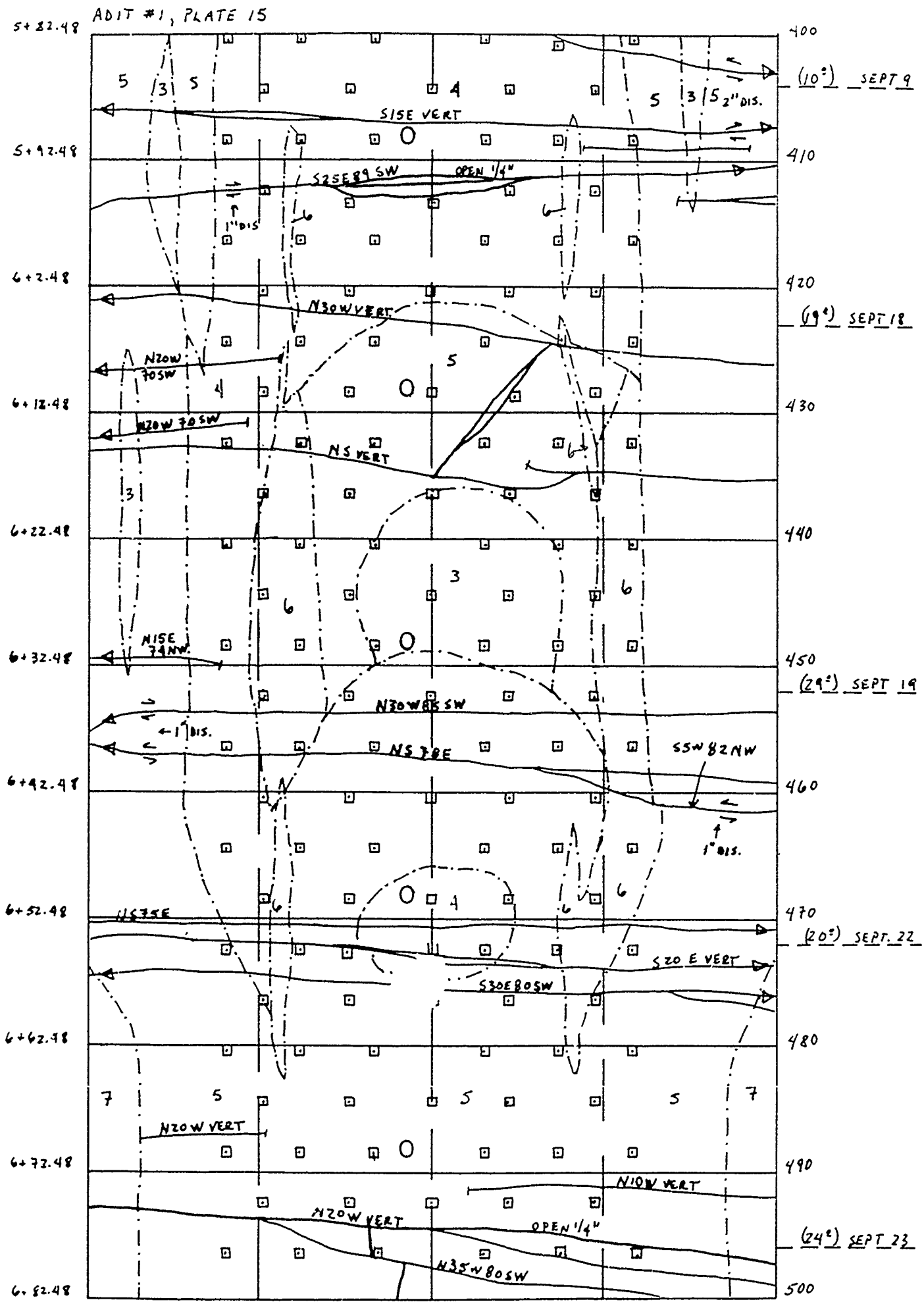
DIT #1, PLATE 12



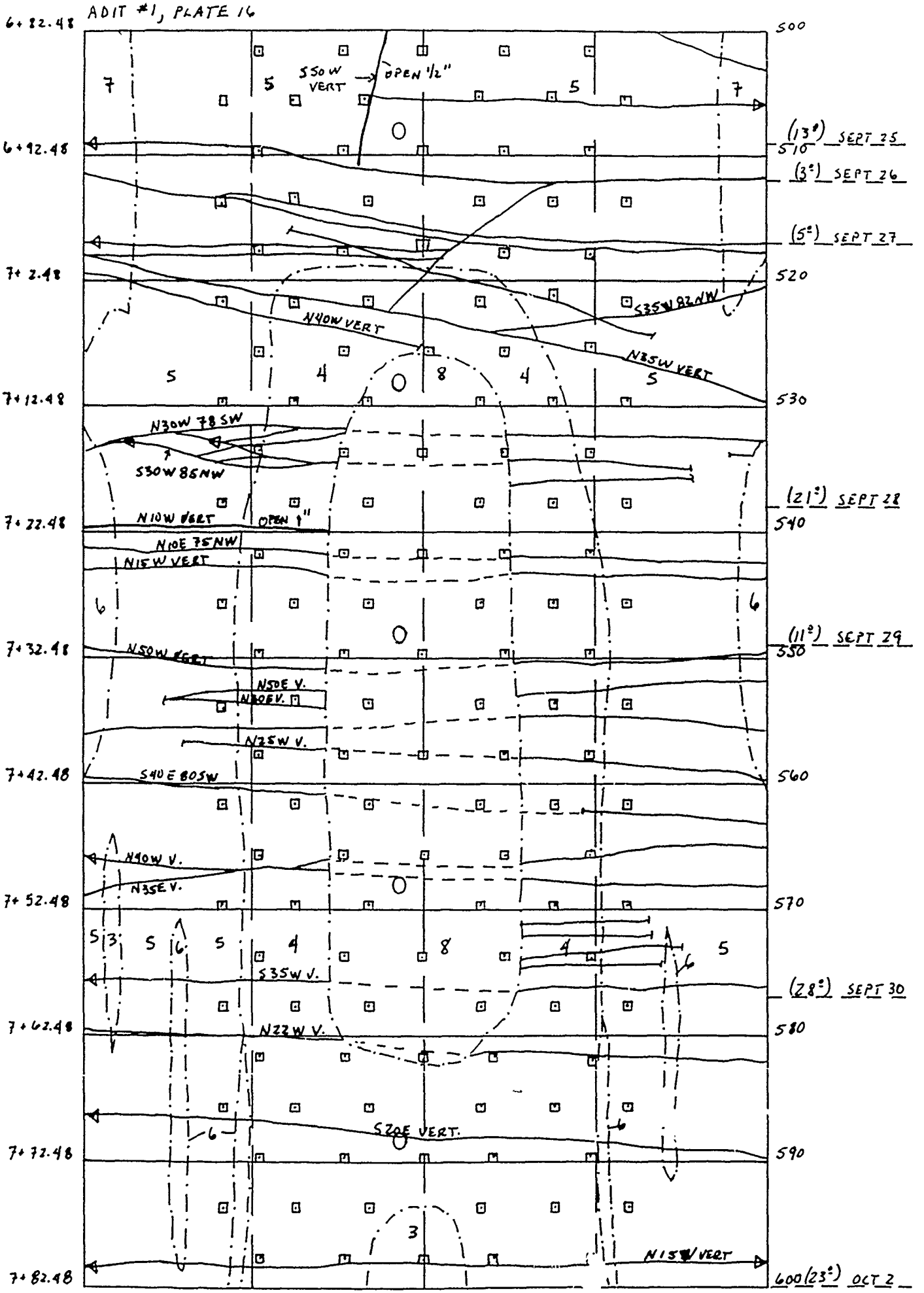
ADIT #1, PLATE 13

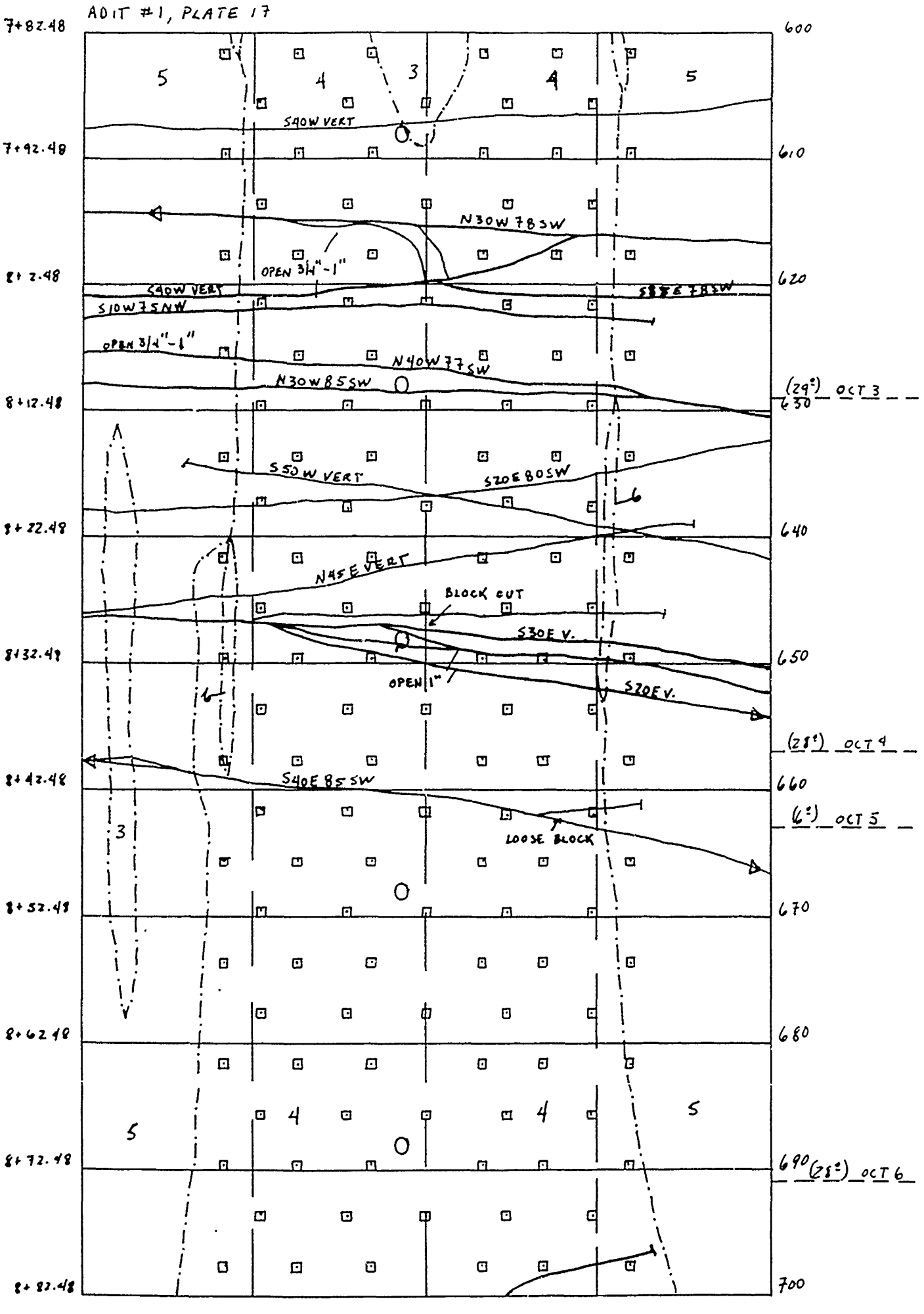


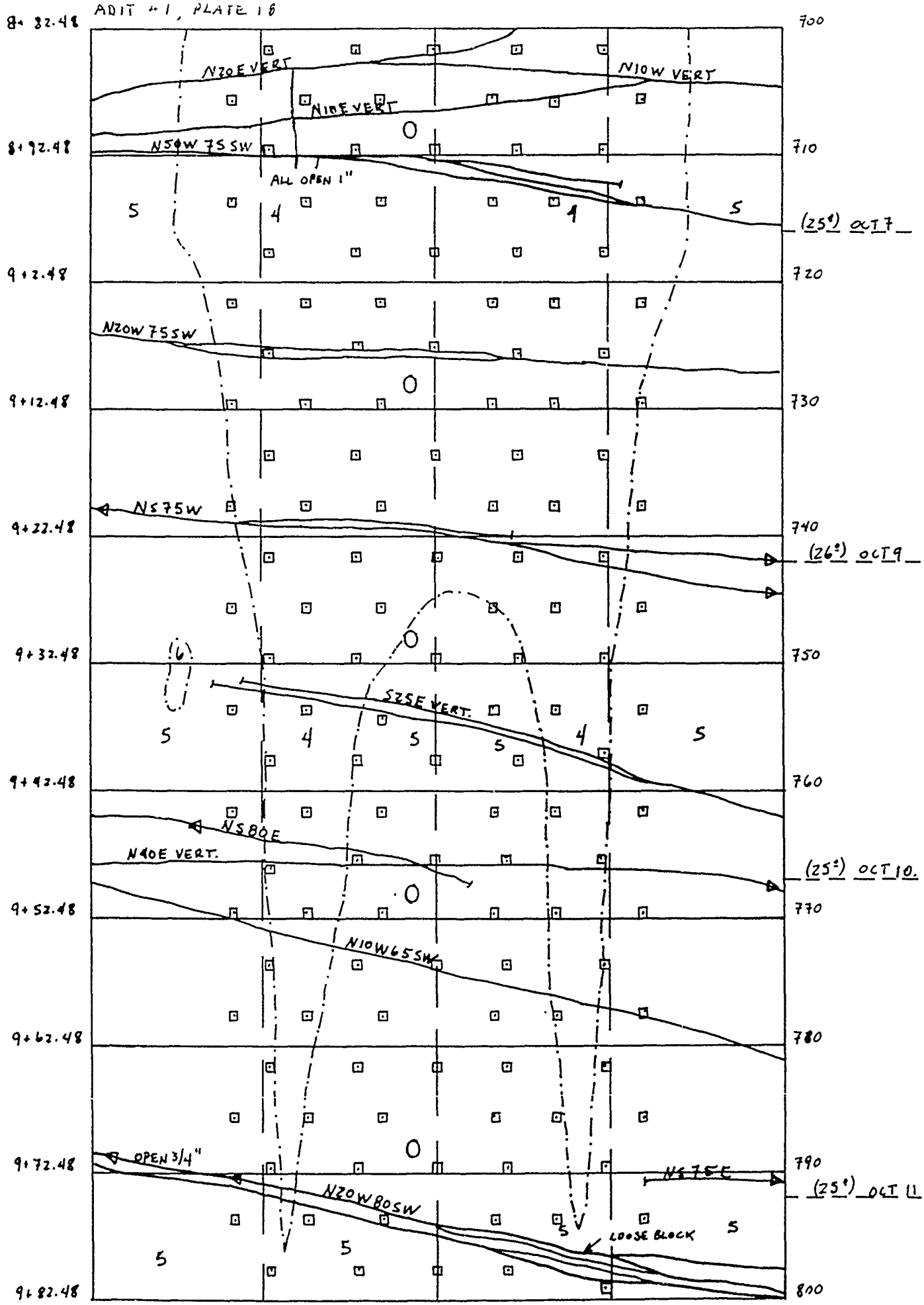

ADIT #1, PLATE 14
4+82.48
4+92.48
5+2.48
5+12.48
5+22.48
5+32.48
5+42.48
5+52.48
5+62.48
5+72.48
5+82.48
300
310
320
330
340
350
360
370
380
390
400
(26°) AUG. 15
(25°) AUG 16
(21°) AUG 17
(20°) AUG 18
(13°) AUG. 19
S55W VERT
S20W 82SE
S25E 85SW
S25E 80SW
S35E 74SW
OPEN 1/2"
S15E 72SW
N23 75W
N50E 78SE
OPEN 1/2"
N20W VERT
N35W 85SW
OPEN 1/4" - 1/2"
N8E 84SE
N5E 84SE
N5W 82SW
N10E 75SE
LOOSE
S40W 68SE
LOOSE BLOCK
N5E 84SE
2" DIS.
N5E 79SE
N20W 80SW
S35E 80SW
LOOSE BLOCK
S40E 85SW
S70W 82SE
N20W VERT
LOOSE BLOCK
ALL OPEN 1/4" - 1/2"
N10E 78NW
N20W VERT
LOOSE BLOCK
N10W 84SW
N10E 70SE

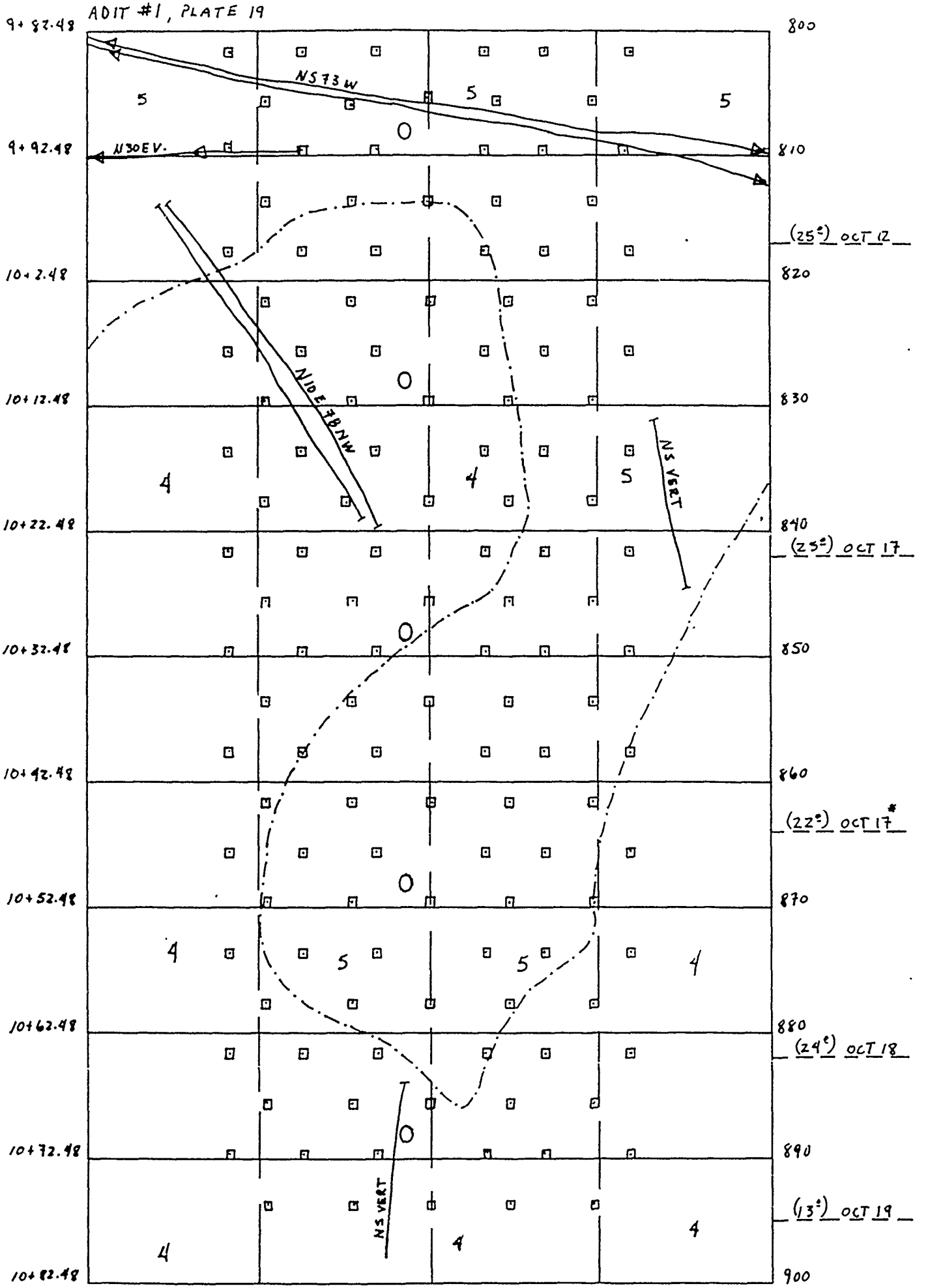

ADIT #1, PLATE 15
5+82.48
5+92.48
6+2.48
6+12.48
6+22.48
6+32.48
6+42.48
6+52.48
6+62.48
6+72.48
6+82.48
400
410
420
430
440
450
460
470
480
490
500
(10°) SEPT 9
(19°) SEPT 18
(29°) SEPT 19
(20°) SEPT. 22
(24°) SEPT 23
S15E VERT
2" DIS.
S25E89 SW
OPEN 1/4"
1" DIS
N30W VERT
N20W 70SW
N20W 70SW
NS VERT
N15E 74NW
N30W85SW
1" DIS.
NS 78E
S5W 82NW
1" DIS.
N15E75E
S20E VERT
S30E80SW
N20W VERT
N10W VERT
N20W VERT
OPEN 1/4"
N35W80SW

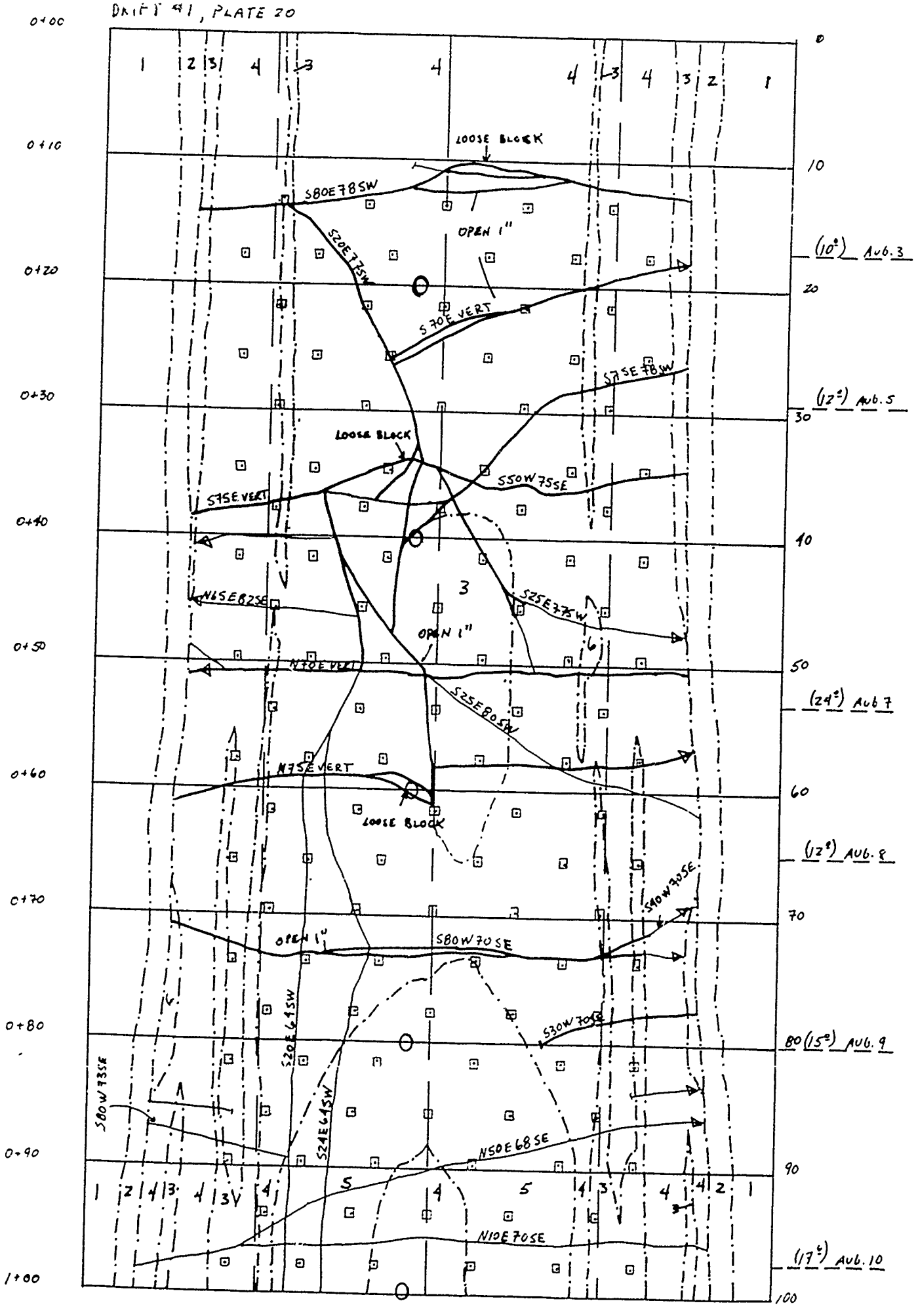
ADIT #1, PLATE 16



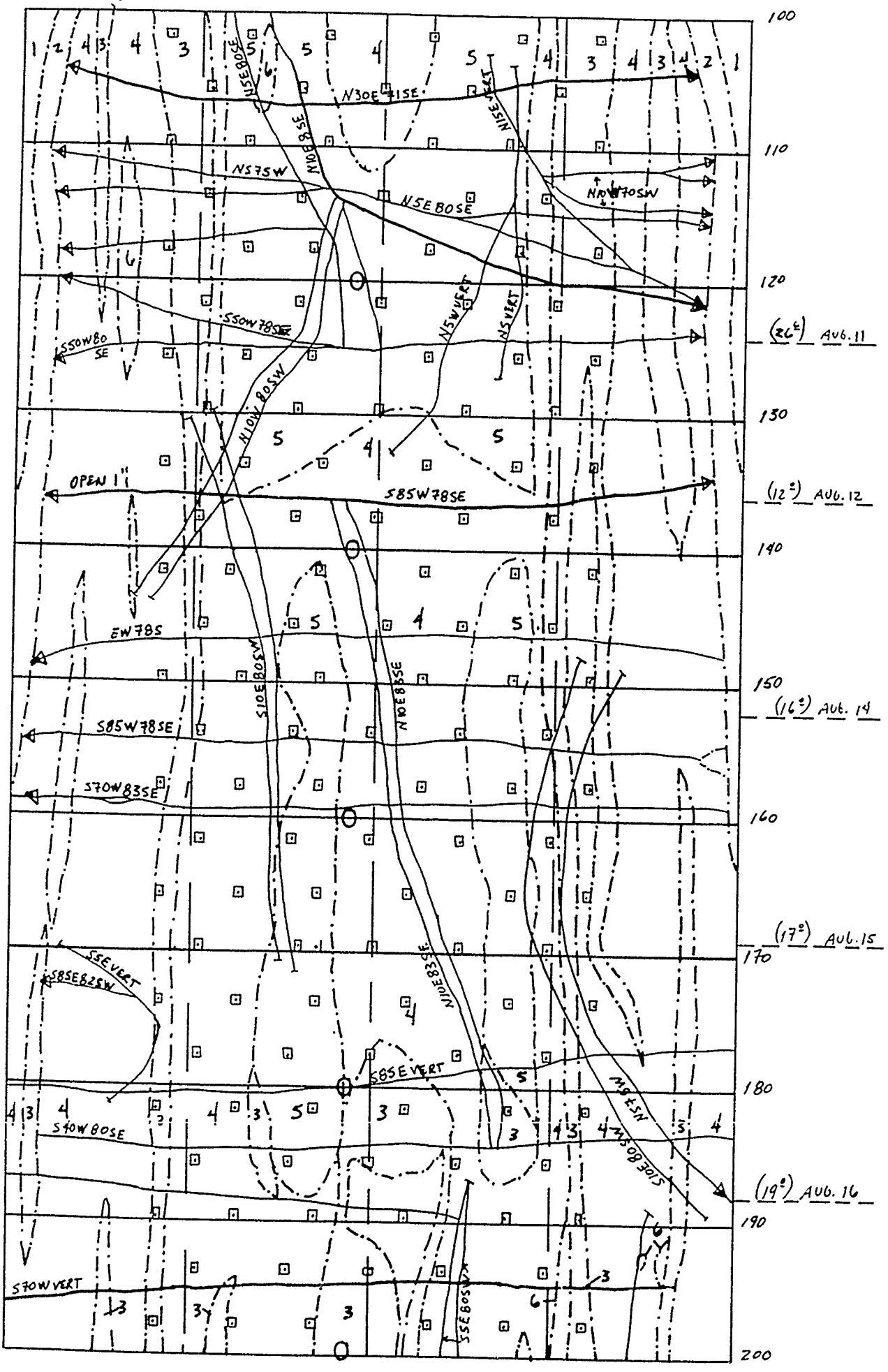

ADIT #1, PLATE 17
7+82.48
7+92.48
8+2.48
8+12.48
8+22.48
8+32.48
8+42.48
8+52.48
8+62.48
8+72.48
8+82.48
600
610
620
630
640
650
660
670
680
690
700
5
4
3
4
5
S40W VERT
N30W 78SW
OPEN 3/4"-1"
S40W VERT
S10W 75NW
S88E 78SW
OPEN 3/4"-1"
N40W 77SW
N30W 85SW
(29°) OCT 3
S50W VERT
S20E 80SW
N45E VERT
BLOCK CUT
S30E V.
OPEN 1"
S20E V.
(28°) OCT 4
S40E 85SW
(6°) OCT 5
LOOSE BLOCK
3
4
4
5
5
690 (28°) OCT 6

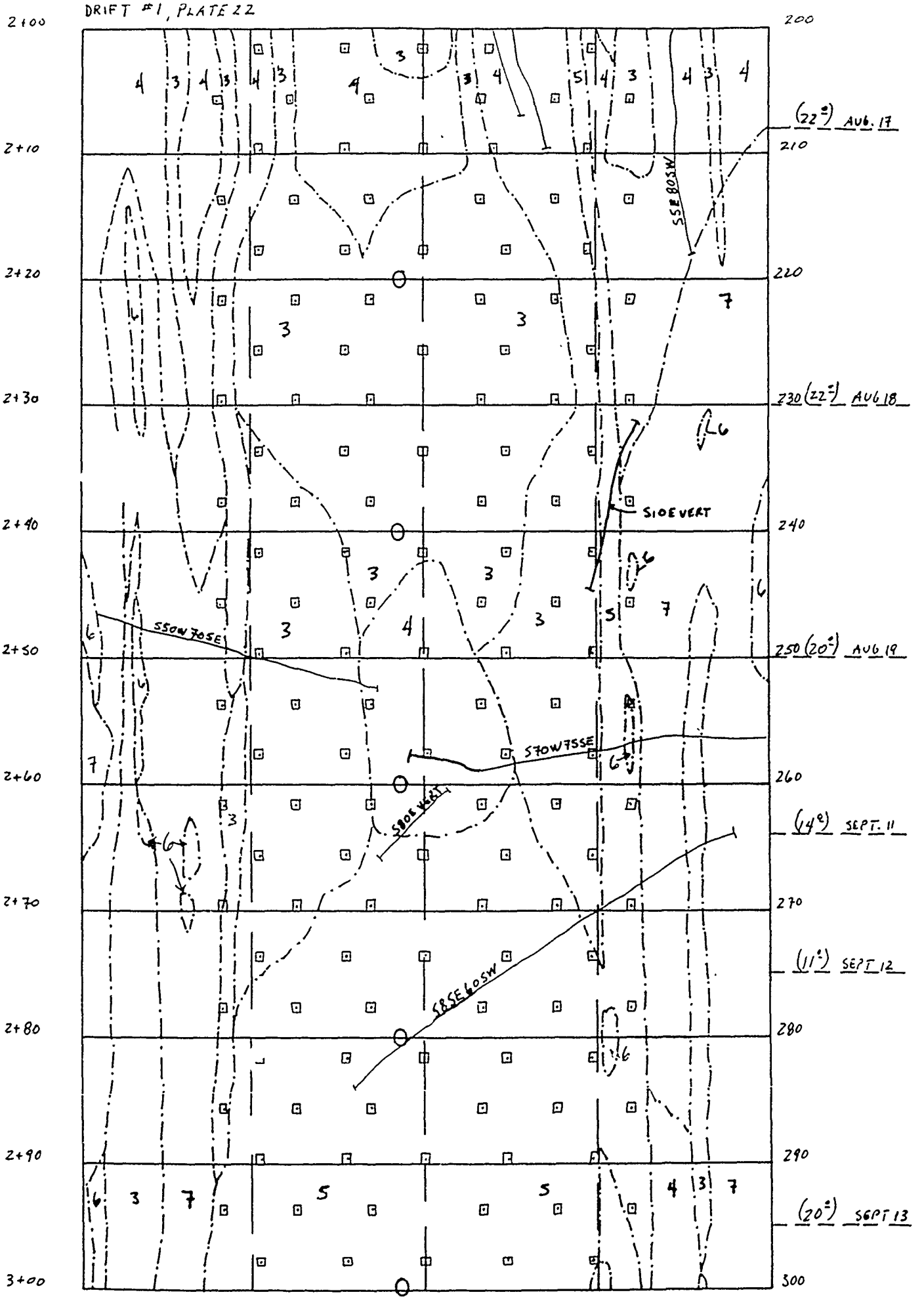

ADIT #1, PLATE 18
8+82.48
8+92.48
9+2.48
9+12.48
9+22.48
9+32.48
9+42.48
9+52.48
9+62.48
9+72.48
9+82.48
700
710
720
730
740
750
760
770
780
790
800
N20E VERT
N10E VERT
N10W VERT
N50W 75 SW
ALL OPEN 1"
(25°) OCT 7
N20W 75 SW
N57 5W
(26°) OCT 9
S25E VERT.
N58OE
N40E VERT.
(25°) OCT 10.
N10W 65 SW
OPEN 3/4"
N20W 80 SW
N57 5E
(25°) OCT 11
LOOSE BLOCK

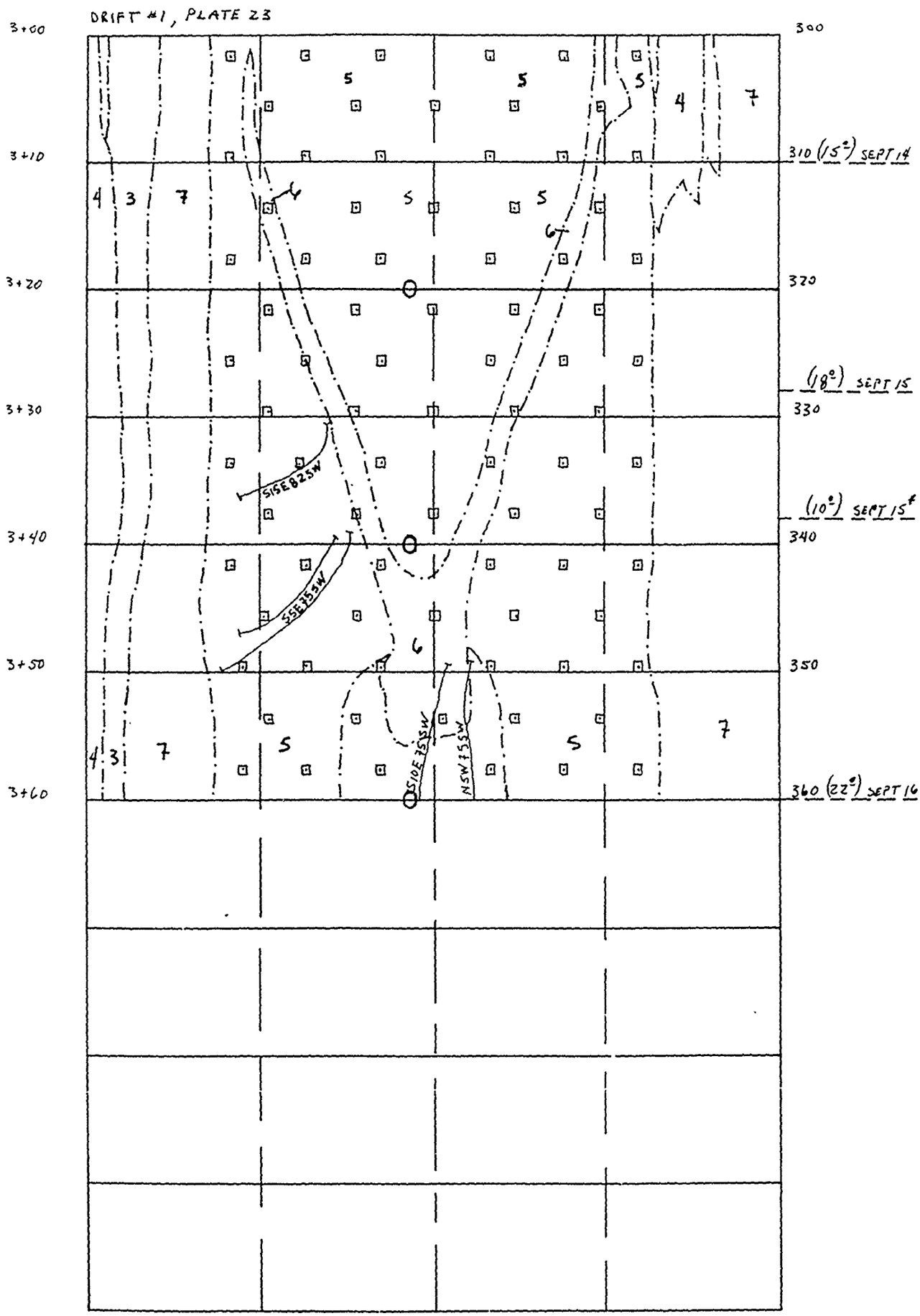

ADIT #1, PLATE 19
9+82.48
9+92.48
10+2.48
10+12.48
10+22.48
10+32.48
10+42.48
10+52.48
10+62.48
10+72.48
10+82.48
800
810
820
830
840
850
860
870
880
890
900
N53W
N30EV.
N10E 28NW
N5 VERT
N5 VERT
(25°) OCT 12
(25°) OCT 17
(22°) OCT 17*
(24°) OCT 18
(13°) OCT 19
5
4
O


DRIFT 41, PLATE 20
0+00
0+10
0+20
0+30
0+40
0+50
0+60
0+70
0+80
0+90
1+00
0
10
20
30
40
50
60
70
80
90
100
LOOSE BLOCK
S80E78SW
S20E73SW
OPEN 1"
S70E VERT
S75E78SW
LOOSE BLOCK
S75E VERT
S50W75SE
N65E82SE
S25E77SW
OPEN 1"
N70E VERT
S25E80SW
N75E VERT
LOOSE BLOCK
OPEN 1"
S80W70SE
S80W70SE
S30W70SE
S80W73SE
S20E64SW
S24E64SW
N50E68SE
N10E70SE
(10°) Aub.3
(12°) Aub.5
(24°) Aub.7
(12°) Aub.8
80 (15°) Aub.9
(17°) Aub.10

DRIFT #1, PLATE 21




DRIFT #1, PLATE 22
2+00
2+10
2+20
2+30
2+40
2+50
2+60
2+70
2+80
2+90
3+00
200
210
220
230
240
250
260
270
280
290
300
(22°) AUG. 17
(22°) AUG 18
(20°) AUG 19
(14°) SEPT. 11
(11°) SEPT 12
(20°) SEPT 13
SSE 80 SW
S10E VERT
S50W 70SE
S70W 75SE
S80E VERT
S85E 60SW


DRIFT #1, PLATE 23
3+00
3+10
3+20
3+30
3+40
3+50
3+60
300
310 (15°) SEPT 14
320
(18°) SEPT 15
330
(10°) SEPT 15
340
350
360 (22°) SEPT 16
S15E82SW
SSE35SW
S10E35SW
NSW35SW
4
3
7
5
6

APPENDIX 8

LITHOLOGIC DESCRIPTIONS

PORTAL NO. 1 - ROCK DESCRIPTIONS

1. Mudstone: Dark red in color, unweathered, silty to clay texture, very fine grained, scattered irregular pockets of bentonitic siltstone throughout, massive bedding, poorly cemented, blocky shape, tight and widely spaced joints with slickensides on joint surface, slakes readily when exposed.

2. Mudstone: Two to three inch green clay layer atop a 1 foot thick dark blue to black mudstone which was: soft, unweathered, had a silty texture, very fine grained, thinly bedded, poorly cemented, unfractured and contained abundant muscovite throughout.

2a. Clay: Bentonitic clay concentrated near base of joints at sandstone/mudstone contact, light green in color, very fine grained, clay texture, massive, unfractured.

3. Sandstone. White in color, slightly weathered, medium to coarse grained, sandy texture, fairly well cemented, massive bedding, tight and widely spaced joints, blocky shape, conglomeritic with depth. (Quartzarenite)

4. Sandstone: Same as Item 3 above with FeO stains throughout, and closely spaced tight joints.

5. Sandstone: Purple in color, soft, unweathered, sandy texture, fine grained, poorly cemented, massive bedding, unfractured, blocky shape. (Quartzarenite)

6. Mudstone. Dark red in color, very soft to soft, unweathered, silty texture, very fine grained, poorly cemented, massive bedding, unfractured, blocky shape.

7. Mudstone: Same as Item 6 above, with the exception of darker in color and more sand present.

8. Sandstone: White in color, soft to moderately hard, slightly weathered, sandy texture with medium size clasts, medium to coarse grained, thick bedding, tight and widely spaced joints, blocky shape, moderately cemented. (Quartzarenite)

9. Sandstone: Black in color, slightly weathered, sandy texture, fine grained, thinly bedded, tight and widely spaced joints, poorly cemented. (Quartzarenite)

10. Sandstone: Same as Item 9 with the exception of color (red) and the presence of mudstone.

11. Sandstone: Same as Item 9 with the exception of color (brown) and the presence of mudstone.

12. Siltstone. Purple in color, very soft, decomposed, fissile, shaly, very fine grained, tabular, very poorly cemented.

PORTAL NO. 2 - ROCK DESCRIPTIONS

1. Mudstone: Dark reddish brown; very fine grained with scattered fine grains; moderately soft to soft; unweathered, laminated and slightly fissile; scattered irregular to well rounded nodules of soft bentonitic siltstone scattered throughout; muscovite is concentrated along lamination planes; close to very closely jointed; joints are smooth; tight and are slickensided and polished; in upper 1 foot, joints are coated with montmorillanite; poorly cemented; slakes readily when exposed.

2. Quartz Sandstone: Primarily white; hard to very hard; fine to coarse grained; composed of fine to coarse, mostly medium to coarse, subangular quartz and quartzite grains with scattered subrounded gravel to 1 inch in a slightly calcareous and non-calcareous, siliceous cement; slightly weathered to unweathered; very thinly to thinly bedded and cross bedded; widely jointed; joints are tight, slightly rough to rough, and coated with minor FeO stains; moderately to well cemented, scattered thin beds of mostly coarse grained material.

3. Calcareous Conglomertic Sandstone: Primarily white, hard to very hard; fine to very coarse grained, mostly coarse; composed of about 80% fine to coarse, mostly medium to coarse, subangular quartz and quartzite grains, and 20% subangular to subrounded quartz and quartzite gravel to 1.5 inches in a calcareous-siliceous cement; slightly weathered to unweathered; thin to medium bedded; widely jointed; joints are tight, slightly rough to rough, and coated with minor FeO stains and a trace of clay; moderately to well cemented; upper four feet is slightly to non-calcareous.

4. Quartz Sandstone: White; fine to coarse grained with scattered, very coarse grains; moderately hard; composed of fine to coarse, with scattered very coarse to 1/2 inch, subrounded quartz and minor quartzite grains; unweathered; thin bedded and cross bedded; widely jointed; joints are slightly rough, tight; and have minor FeO stains; moderately to well cemented.

5. Sandy Mudstone: Grayish red to very dark red; very fine to fine grained; moderately soft; composed of 75% clay and 25% fine, subrounded quartz grains in iron-silica cement; unweathered; laminated and fissile with abundant polished surfaces; close to very closely jointed; joints are smooth and tight; poorly cemented; slakes readily when exposed to air.

6. Quartz Sandstone: White mottled with abundant FeO stains; fine to medium grained; soft to moderately soft; composed of subrounded quartz grains; moderately weathered; very thin bedded; moderately close jointed; joints are rough, open to 1 mm, with abundant FeO stains; moderately cemented.

7. Conglomeritic Quartz Sandstone. Mottled very light gray and minor dark gray; very fine to very coarse grained, mostly coarse to very coarse; moderately soft to moderately hard; composed of fine to very coarse, mostly coarse to very coarse, subrounded to subangular quartz and minor quartzite grains to 3/8 inch; unweathered; thin bedded, very widely jointed; moderately cemented.

8. Sandstone. Light gray; fine to coarse grained; mostly medium; moderately soft to moderately hard; composed primarily of subangular to subrounded quartzite grains with minor lithic, mafic, and quartz grains in siliceous cement; unweathered, thin bedded; very wide to widely jointed; joints are rough, tight and coated with minor CaCO3; moderately cemented.

9. Quartz Sandstone. Mottled grayish red, white, pale red and light brownish gray; fine to coarse grained, mostly medium; composed of subrounded to subangular quartz grains and minor quartzite in an iron-silica cement; mottling is due to variation in FeO content of matrix as well as bleaching along bedding planes and in irregular masses; color is extremely variable; very thin bedded to laminated, cross bedded; moderately soft; slightly weathered; wide to very widely jointed; joints are tight and rough with minor FeO stains; very minor thin mudstone lamination and lenses scattered throughout, moderately to poorly cemented.

10. Sandstone. Very thinly interbedded with laminated mudstone; sandstone is dark reddish brown; fine to coarse grained, mostly coarse; moderately soft, composed of subangular quartz and quartzite grains in iron-silica cement; mudstone is medium light gray; very fine grained; moderately soft; occurs as laminated irregular lenticular beds and masses with the sandstone; rock is slightly weathered, moderately close to widely jointed; joints are rough and tight; poorly to moderately cemented.

11. Quartz Sandstone. Mottled white and minor medium brownish gray; fine to medium grained, mostly medium with scattered coarse grains; moderately soft to moderately hard; composed primarily of subrounded to subangular quartz grains with scattered thin beds with abundant quartzite and some lithic and mafic grains, resulting in mottled appearance; quartzite is more abundant in bottom 1 foot; unweathered, thin to very thin bedded and cross bedded, wide to very widely jointed; joints are slightly rough to rough with FeO and minor MnO stains; moderately cemented.

12. Silty Sandstone. Mottled grayish red and minor yellowish gray; very fine to fine grained, moderately soft; composed of 60% fine subrounded quartzite and quartz grains and 40% silt; slightly weathered; thin bedded; closely jointed, joints are rough, tight, and are coated with calcite and minor FeO stains; moderately to well cemented.

13. Siltstone. Pinkish gray; very fine grained; moderately soft; medium bedded; siliceous; slightly weathered; very close to closely jointed; joints are slightly rough, tight to open to 2 mm, with abundant FeO stains, some clay, and scattered slickensides; moderately cemented; becomes fissile and slakes readily when exposed.

14. Quartz Sandstone: Laminated to very thinly interbedded with sandy siltstone; 75% sandstone, 25% sandy siltstone; sandstone is mottled white, grayish red purple and dark reddish brown; mottling is due to variations in the FeO content of cement in individual beds; fine to medium grained, mostly medium; moderately hard; composed of 70% subangular to subrounded quartz grains, 20% to 25% quartzite grains and 5% to 10% other lithic and black mafic grains; unweathered to slightly weathered; closely jointed, joints are rough, tight, with minor FeO stains; well cemented; sandy siltstone is medium dark gray, very fine to fine grained; moderately soft to moderately hard; composed of 75% silt and 25% fine quartz grains, unweathered, well cemented, thin beds of coarse gray sandstone and silty sandstone are scattered throughout; individual beds are laminated.

15. Quartz Sandstone. Very light gray; fine to coarse grained, mostly coarse; moderately hard; composed of 90% subrounded to subangular, fine to coarse, mostly coarse, quartz grains and 10% irregular, thin dark gray mudstone lenses; unweathered; thin bedded and cross bedded; very widely jointed; well cemented.

ADIT/DRIFT ROCK DESCRIPTIONS

1. Mudstone: Dark red in color, unweathered, silty to clay texture, very fine grained, scattered irregular pockets of bentonitic siltstone throughout, massive bedding, poorly cemented, blocky shape, tight and widely spaced joints with slickensides on joint surface, slakes readily when exposed.

2. Mudstone: Two to three inch green clay layer atop a 1 foot thick dark blue to black mudstone which was: soft, unweathered, had a silty texture, very fine grained, thinly bedded, poorly cemented, unfractured and contained abundant muscovite throughout.

3. Conglomeritic Sandstone: White and blue in color, medium to coarse grained, clasts up to 2 inches in diameter, hard, well cemented, unweathered, tight and closely to widely spaced joints.

4. Sandstone: White in color, medium to coarse grained, moderately hard to hard, well cemented, slightly weathered, tight to open and closely to widely spaced joints.

5. Sandstone: Blue in color, medium to fine grained, to moderately hard, moderately well cemented, slightly weathered, tight to open and closely to widely space joints.

6. Mudstone/ Clay: Dark blue to black in color, unweathered, clay texture, very fine grained, poorly cemented, slakes readily when exposed.

7. Sandstone: Same as Item 4 with the exception of color (brown to black).

8. Mudstone: Dark blue to black in color, soft to very soft, tabular, very fine grained, poorly cemented, unfractured.

9. Sandstone: White in color, medium to coarse grained, very hard, well cemented, unweathered, cobbles up to 1 inch in diameter present.

10. Sandstone: Interbeded Item 4 and Item 5.

APPENDIX 9

PHOTOGRAPHS OF CONSTRUCTION OF ADITS AND DRIFTS

PHOTO NO. 1 - VIEW OF NORTH ADIT NO. 1 (RIGHT) AND SOUTH ADIT NO. 2 (LEFT).

PHOTO NO. 2 - VIEW OF NORTH (COMPLETED) AND SOUTH (UNDER CONSTRUCTION) SETTLEMENT PONDS.

PHOTO NO. 3 - BACKHOE MOUNTED ROCK HAMMER EXCAVATING NORTH PORTAL FACE.

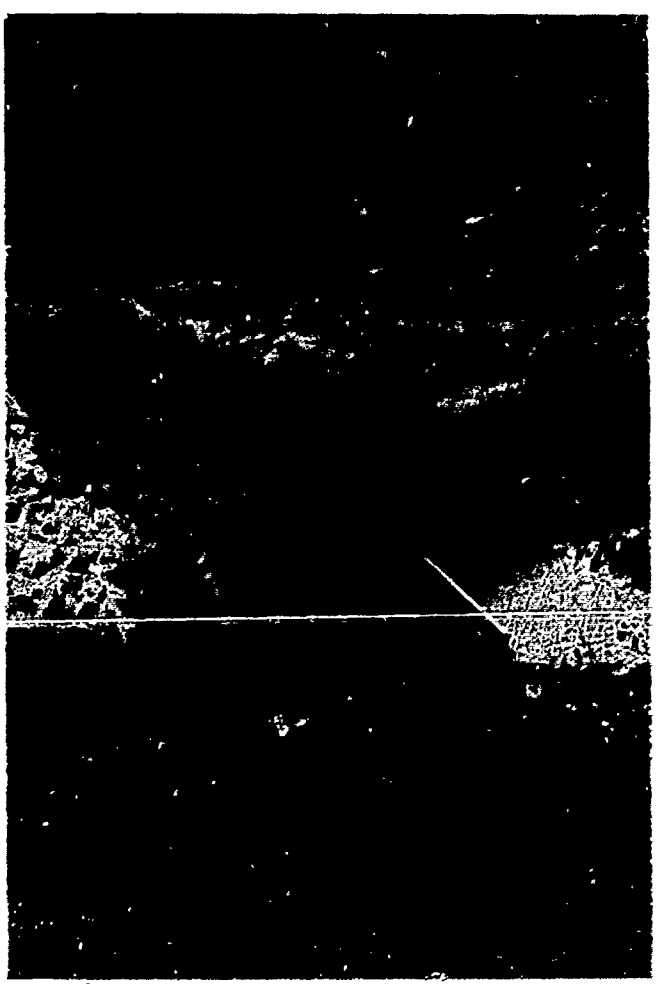


PHOTO NO. 4 - INSTALLATION OF CHAIN LINK FABRIC WITH ROCK BOLTS TO PROTECT PORTAL FACE. (NORTH AREA)

PHOTO NO. 5 - EXCAVATION OF SOUTH PORTAL USING ALPINE MINER.

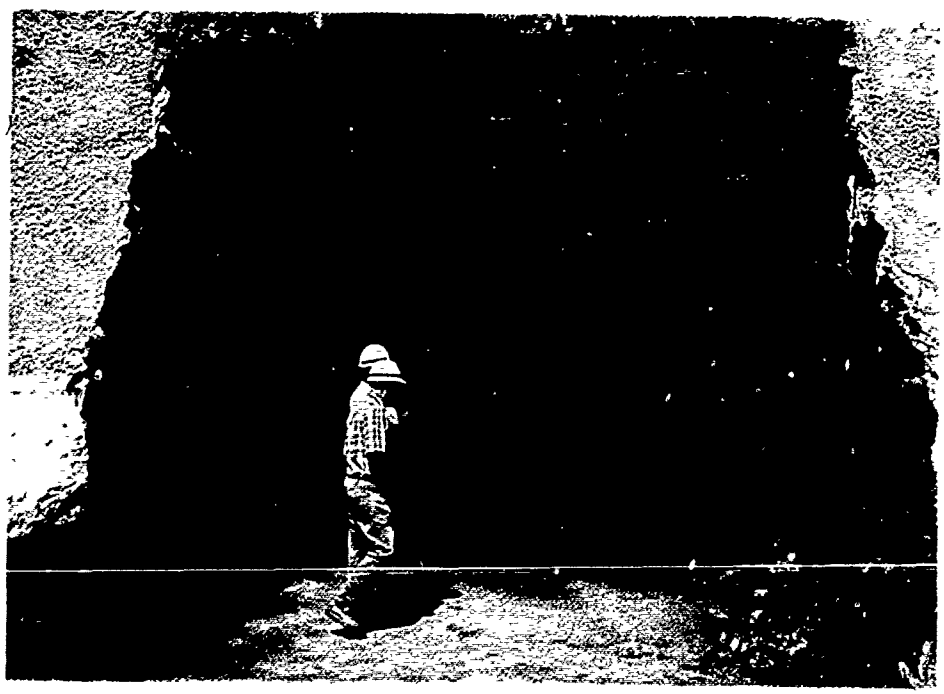


PHOTO NO. 6 - EXCAVATED NORTH PORTAL SHOWING ABO MUDSTONE, AGUA ZARCA SANDSTONE CONTACT.

PHOTO NO. 7 - WIER TO MEASURE ADIT DISCHARGE - SOUTH SIDE.

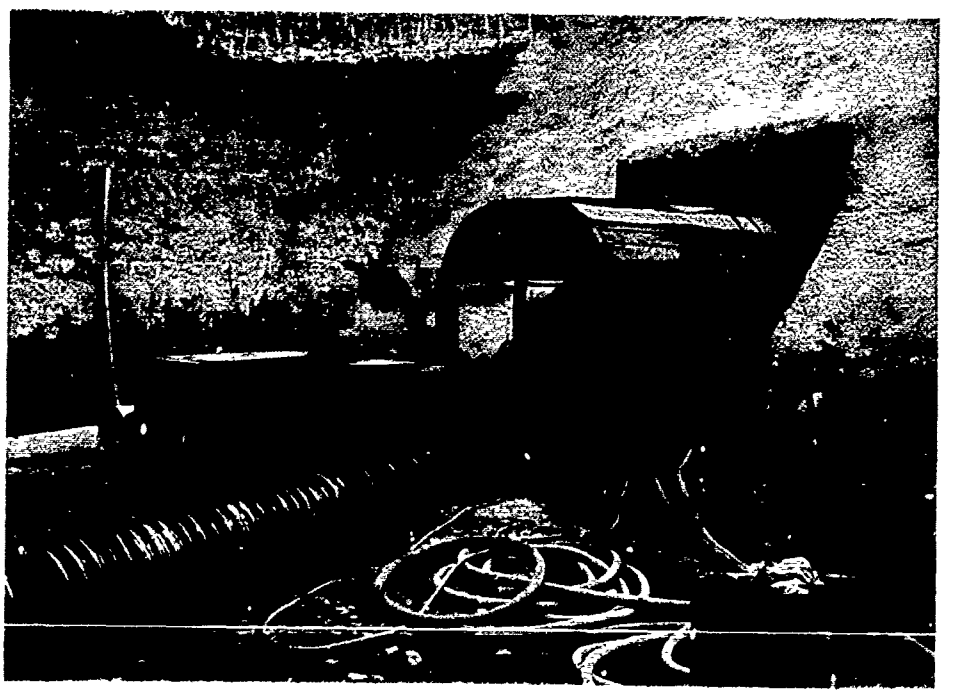


PHOTO NO. 8 - TEMPORARY PORTAL STRUCTURE FOR SOUTH PORTAL.
(NOTE: SAME TYPE OF STRUCTURE WAS USED FOR NORTH PORTAL.)

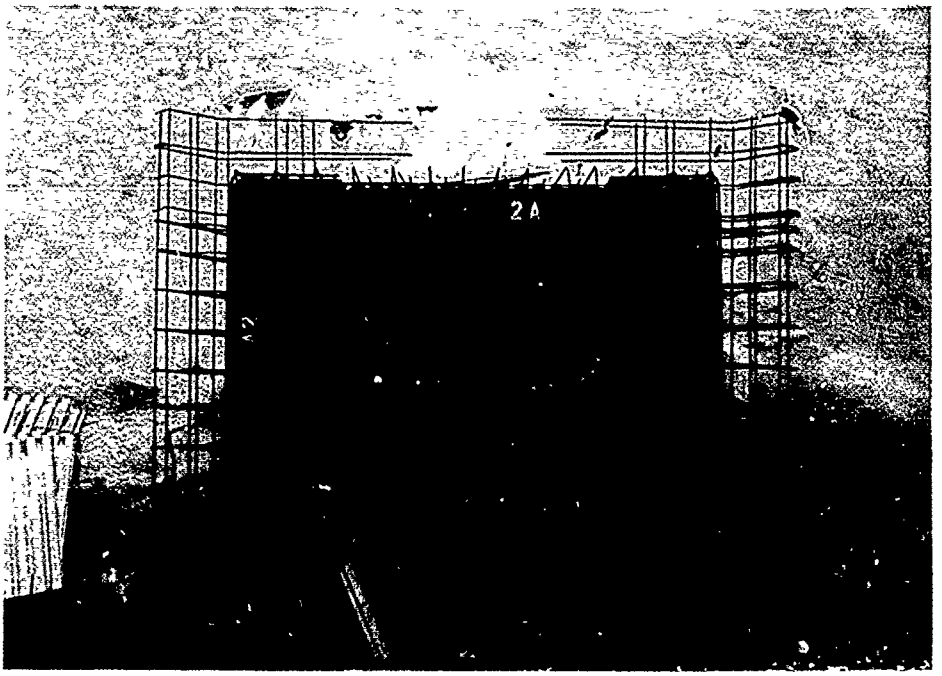


PHOTO NO. 9 - PERMANENT PORTAL FRAME. (TYPICAL BOTH PORTALS, SOUTH PORTAL SHOWN.)

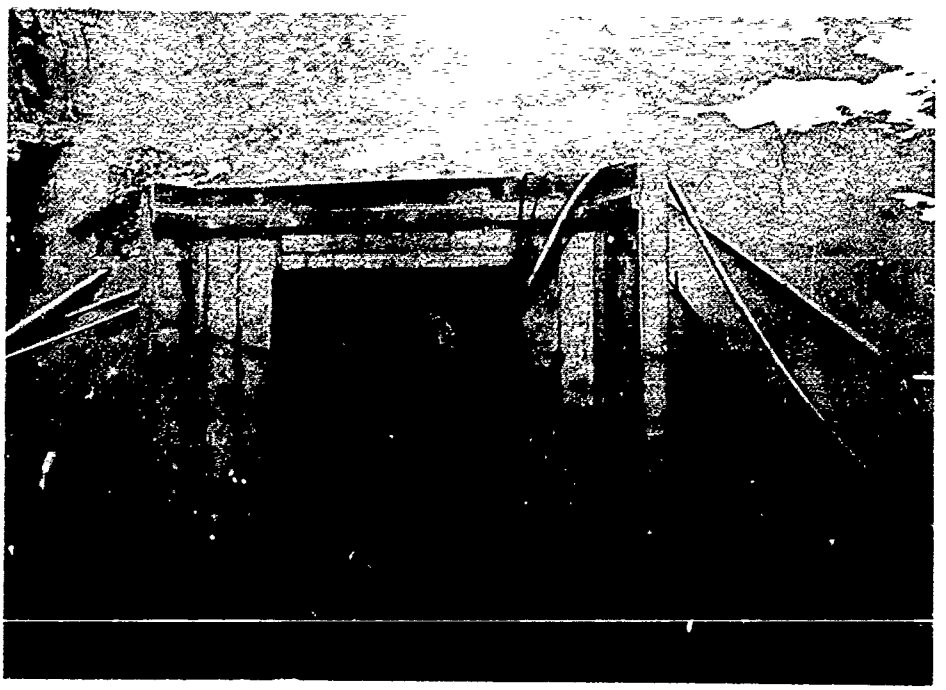


PHOTO NO. 10 - FINISHED CONCRETE PORTAL WITHOUT DOORS. (TYPICAL BOTH PORTALS, SOUTH PORTAL SHOWN)

PHOTO NO. 11 - ALPINE MINER ROADHEADER, ROC-MINER MODEL AEC-250, H SERIES

PHOTO NO. 12 - ALPINE MINER APRON ASSEMBLY.

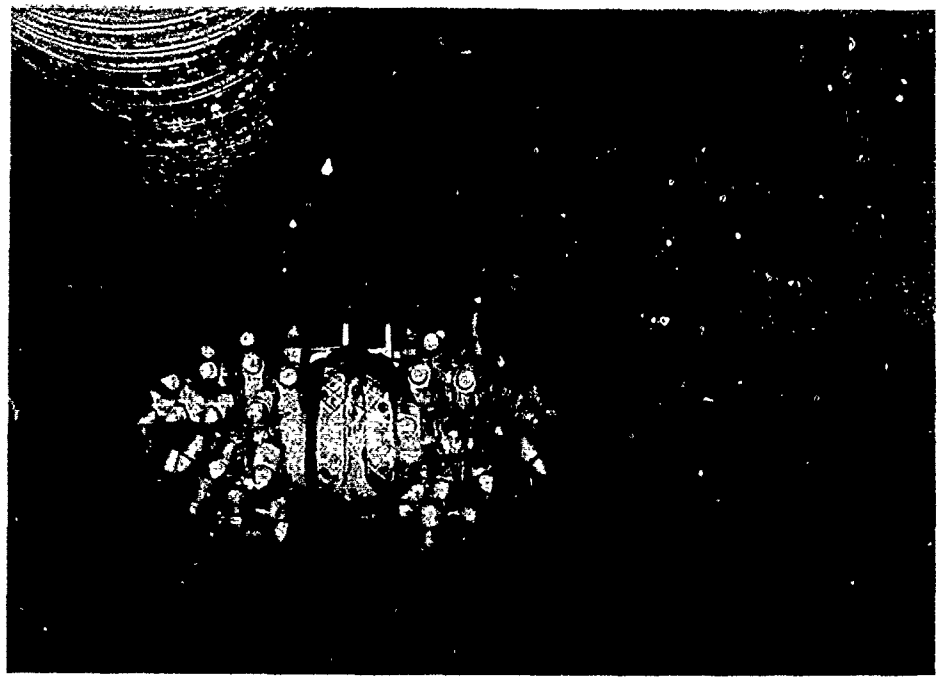


PHOTO NO. 13 - EXCAVATION HEAD ON ALPINE MINER ROADHEADER.

PHOTO NO. 14 - EXCAVATION HEAD ON DOSCO ROADHEADER.

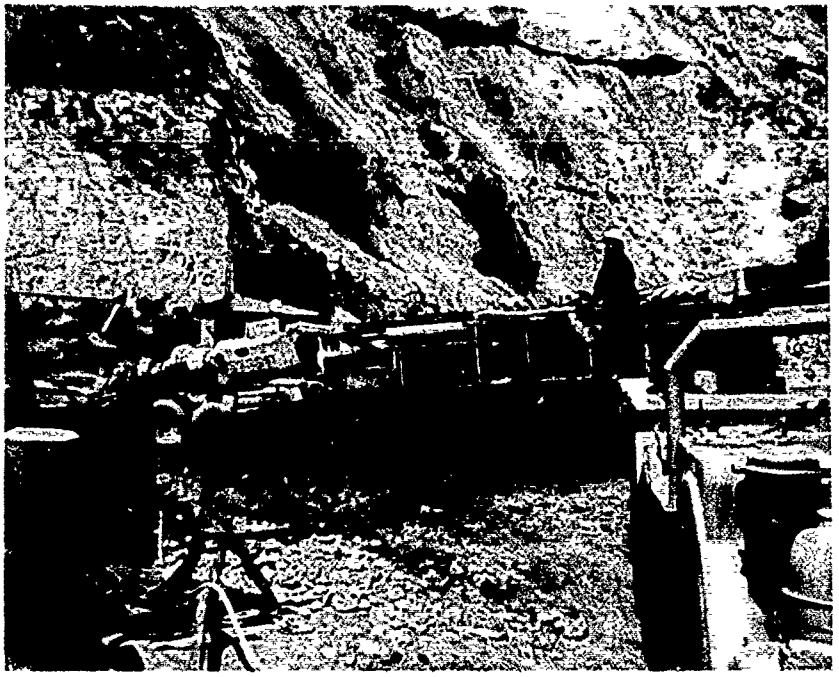


PHOTO NO. 15 - DOSCO ROADHEADER, MODEL SL 120.

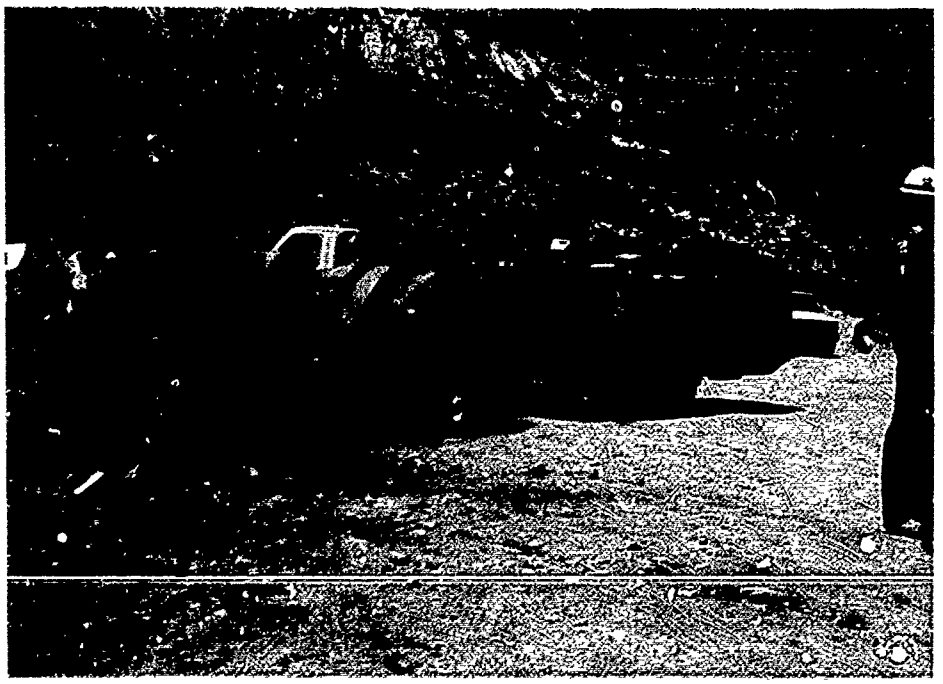


PHOTO NO. 16 - TYPICAL MUCKER USED IN ADIT CONSTRUCTION.

PHOTO NO. 17 - VIEW OUTSIDE OF SOUTH PORTAL SHOWING LASER ALIGNMENT SYSTEM, SKIP LOADER AND LARGE LOADER USED IN ADIT CONSTRUCTION.

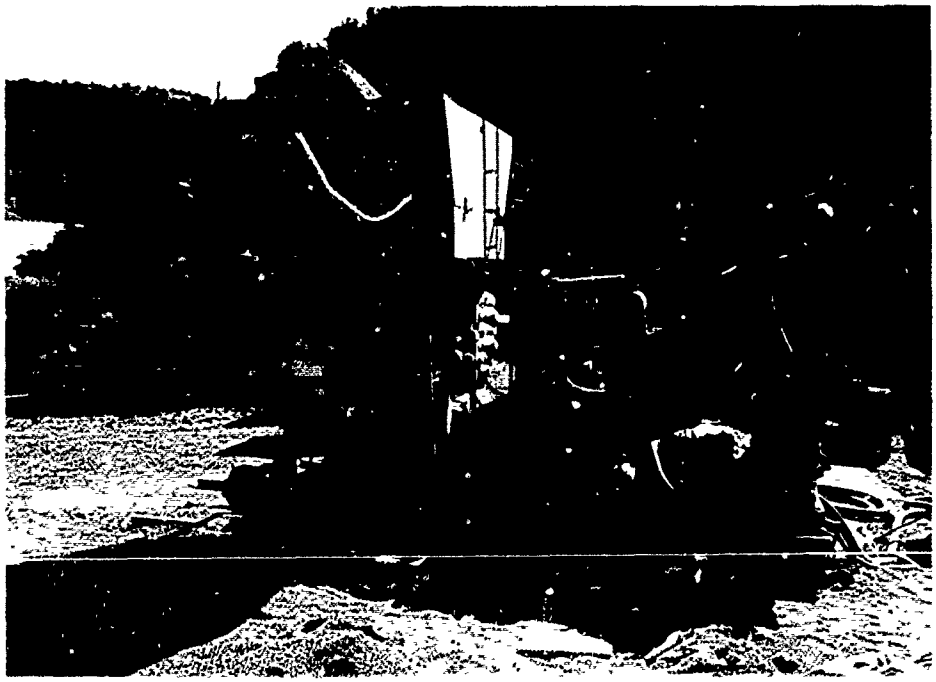


PHOTO NO. 18 - BATCH PLANT USED FOR SHOTCRETE PREPARATION.

PHOTO NO. 19 - TYPICAL EXCAVATION USING ALPINE MINER ROADHEADER.

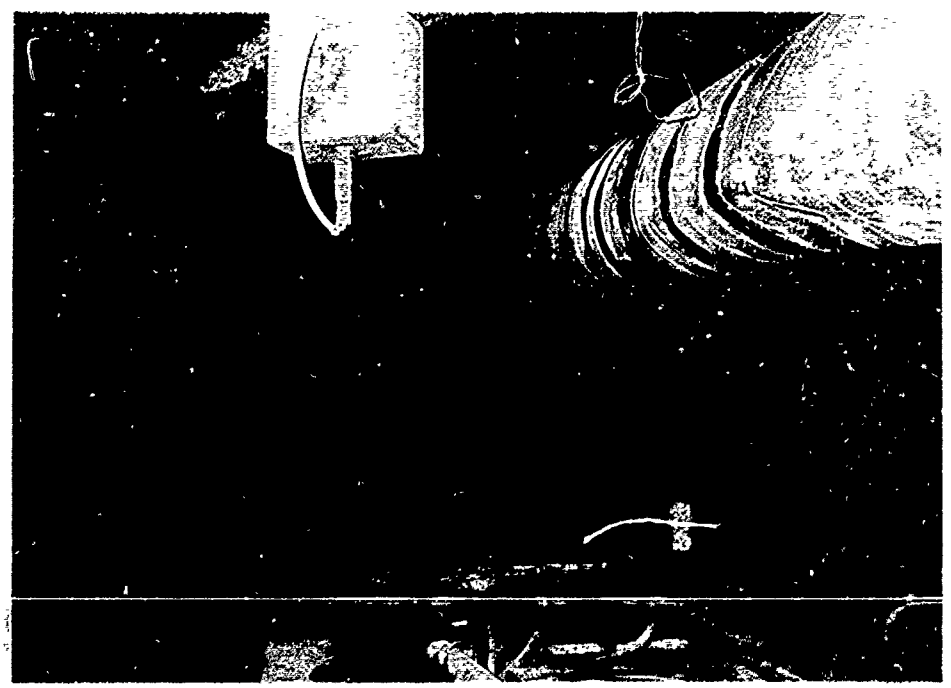


PHOTO NO. 20 - EXCAVATED TUNNEL DIMENSIONS SHOWING TYPICAL AMOUNT OF ADVANCE PER SHIFT. (NOTE: EXCELLENT STABILITY AND LACK OF OVERBREAK IN EXCAVATED SECTION.

PHOTO NO. 21 - TYPICAL FAULTING ENCOUNTERED, SOUTH ADIT, STATION 6+72

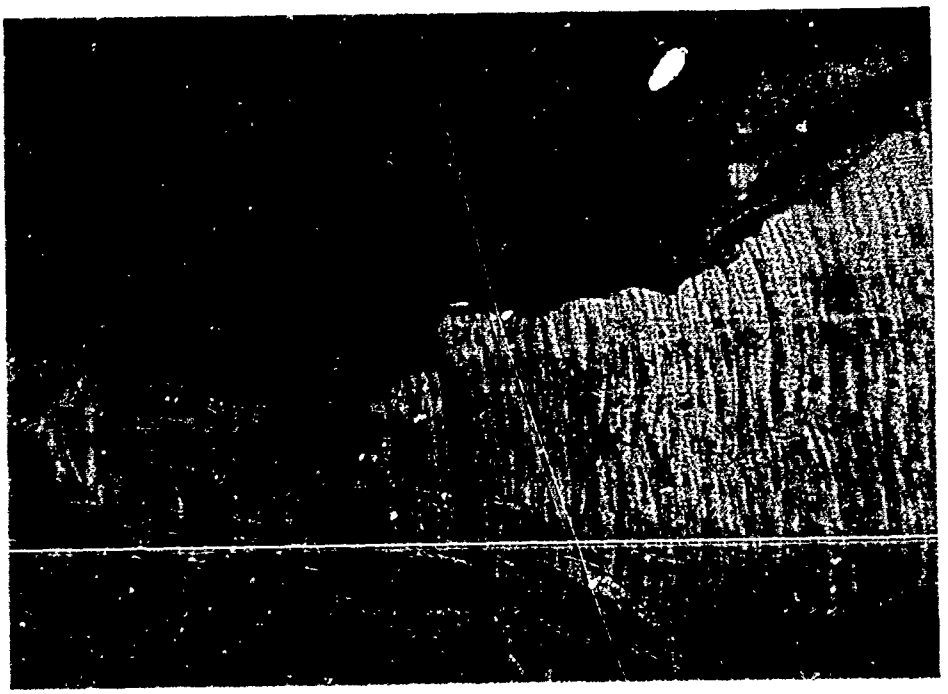


PHOTO NO. 22 - TYPICAL FAULTING ENCOUNTERED, SOUTH DRIFT, STATION 2+00.

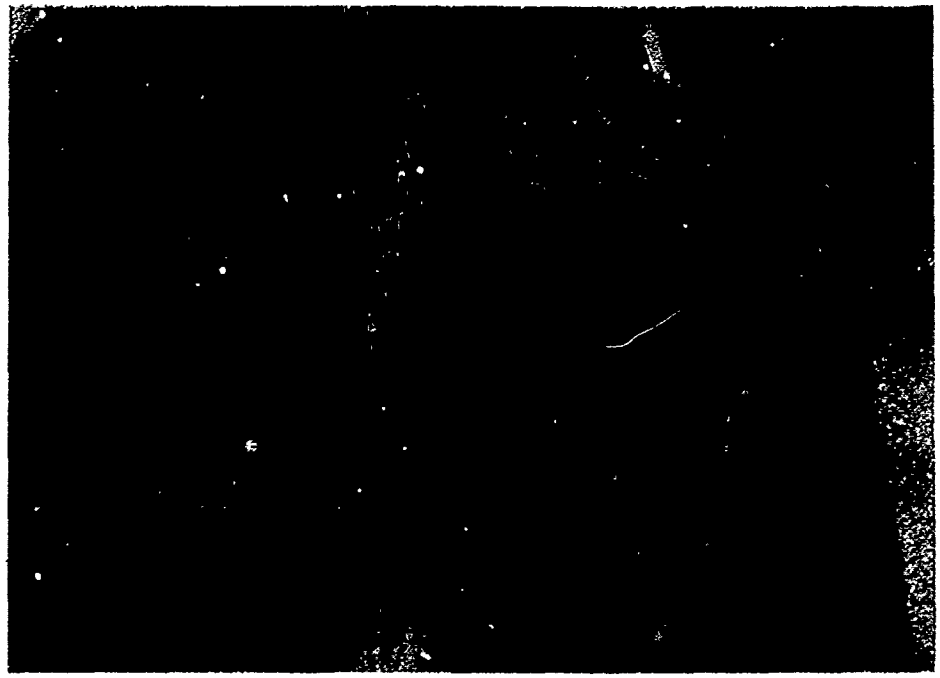


PHOTO NO. 23 - CHECKING TUNNEL DIMENSIONS AND GRADE USING A MEASURING ROD AND LASER.

PHOTO NO. 24 - HYDRAULIC DRILLS USED TO ROCKBOLT.

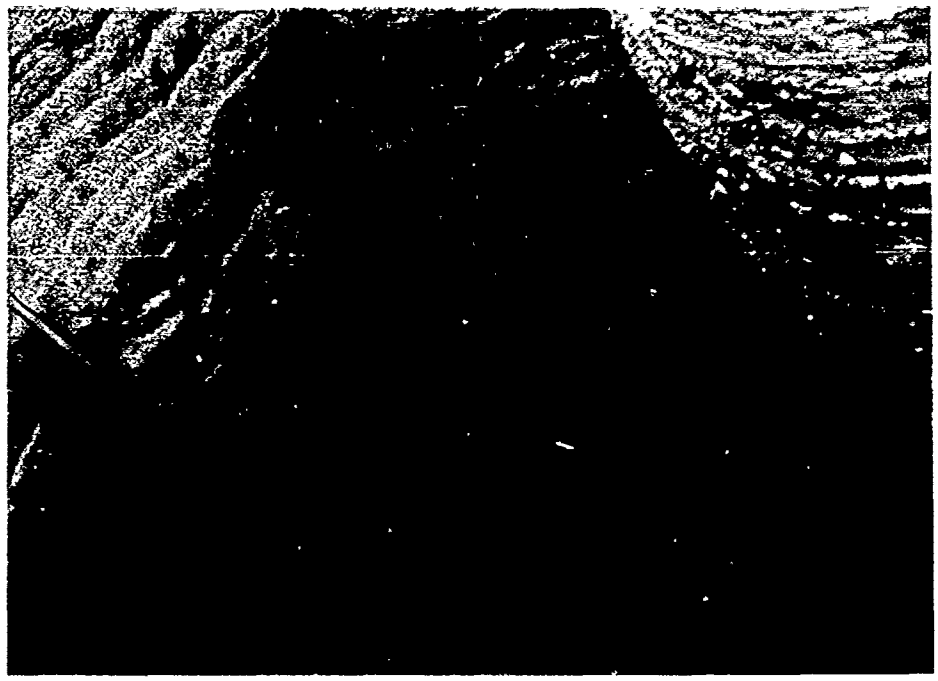


PHOTO NO. 25 - TYPICAL SUPPORT OF LOOSE ROCK WITH ROCKBOLTS.

PHOTO NO. 26 - TYPICAL ROCKBOLT PATTERN. (NOTE: EXCELLENT TUNNEL EXCAVATION WITH NO OVERBREAK.)

PHOTO NO. 27 - APPLICATION OF SHOTCRETE TO TUNNEL WALLS.

PHOTO NO. 28 - VIEW OF SHOTCRETED TUNNEL, SOUTH ADIT STATION 5+00 (NOTE SHOTCRETE DID NOT BOND BELOW SPRINGLINE.)

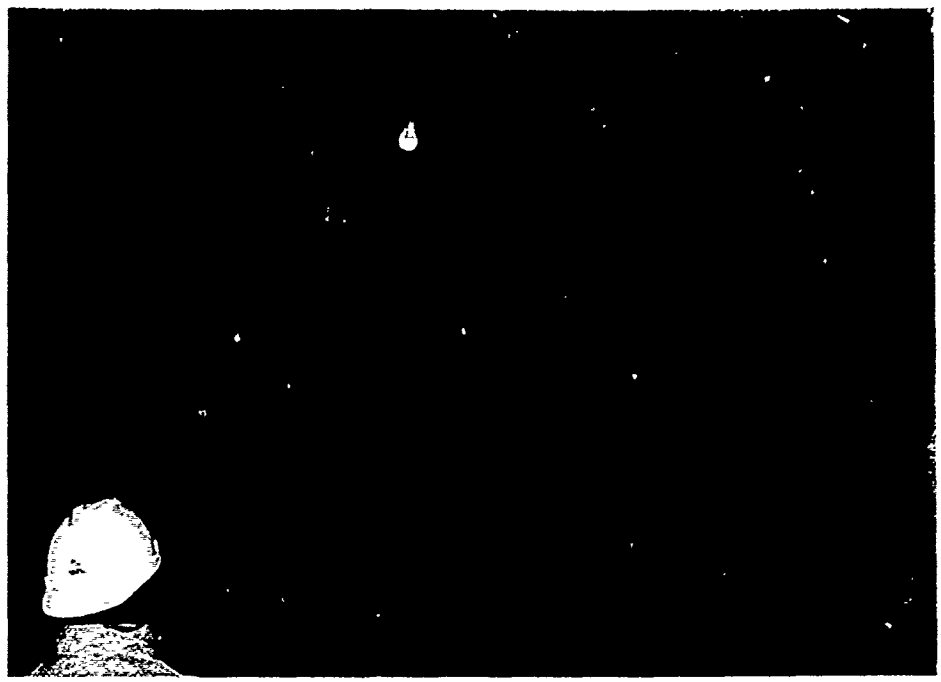


PHOTO NO. 29 - DRAINHOLE DRILLING IN SOUTH ADIT.

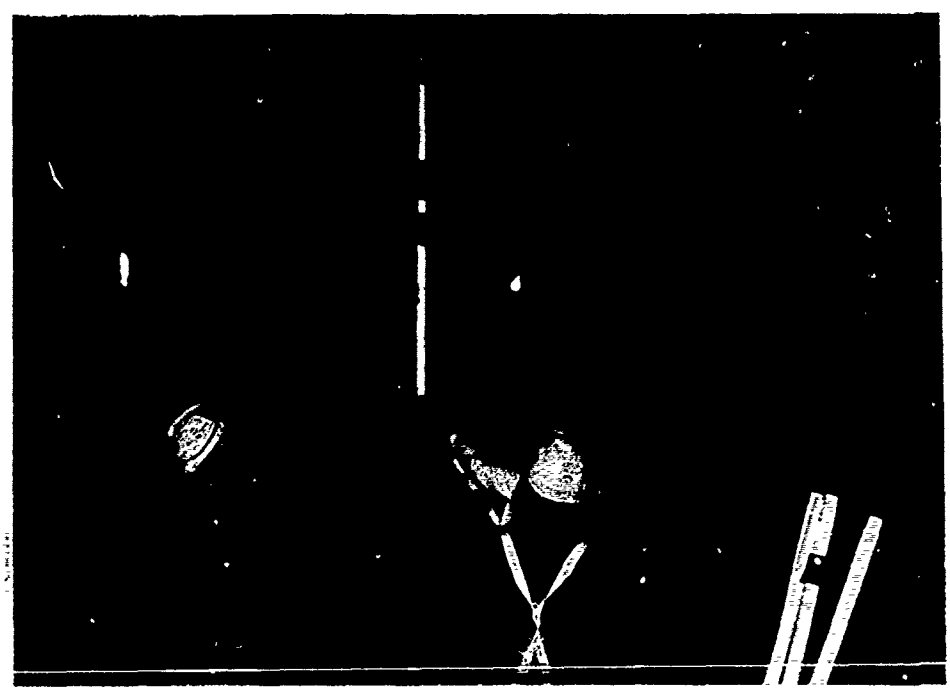


PHOTO NO. 30 - INSTALLATION OF PVC PIPE IN DRAINHOLE.

PHOTO NO. 31 - DIRECTIONAL SURVEYING TOOL BEING USED FOR DRAINHOLE SURVEY.

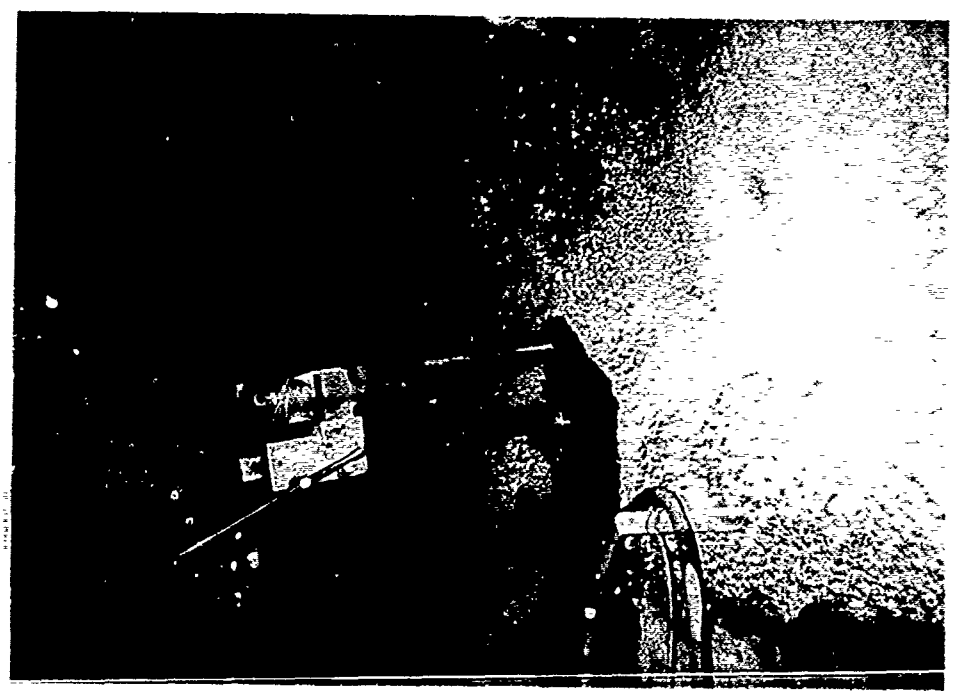


PHOTO NO. 32 - CORING TOOL USED FOR SHOTCRETE SAMPLING.

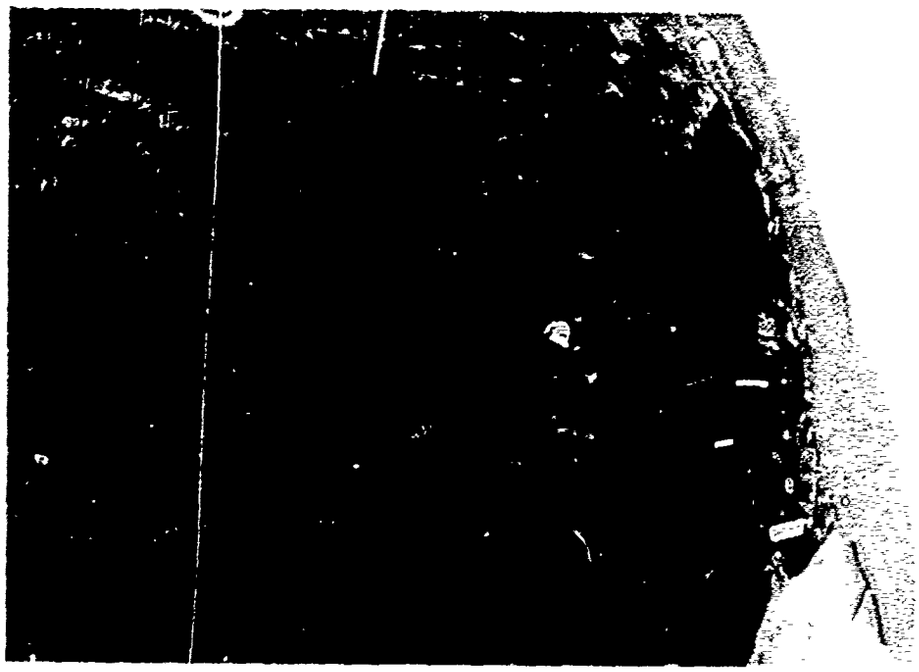


PHOTO NO. 33 - TUNNEL PRIOR TO SHOTCRETE APPLICATION. (TYPICAL.)

PHOTO NO. 34 - TUNNEL AFTER SHOTCRETE APPLICATION. (TYPICAL.)

PHOTO NO. 35 - TUNNEL BIFURCATION - NORTH ADIT - NORTH DRIFT.

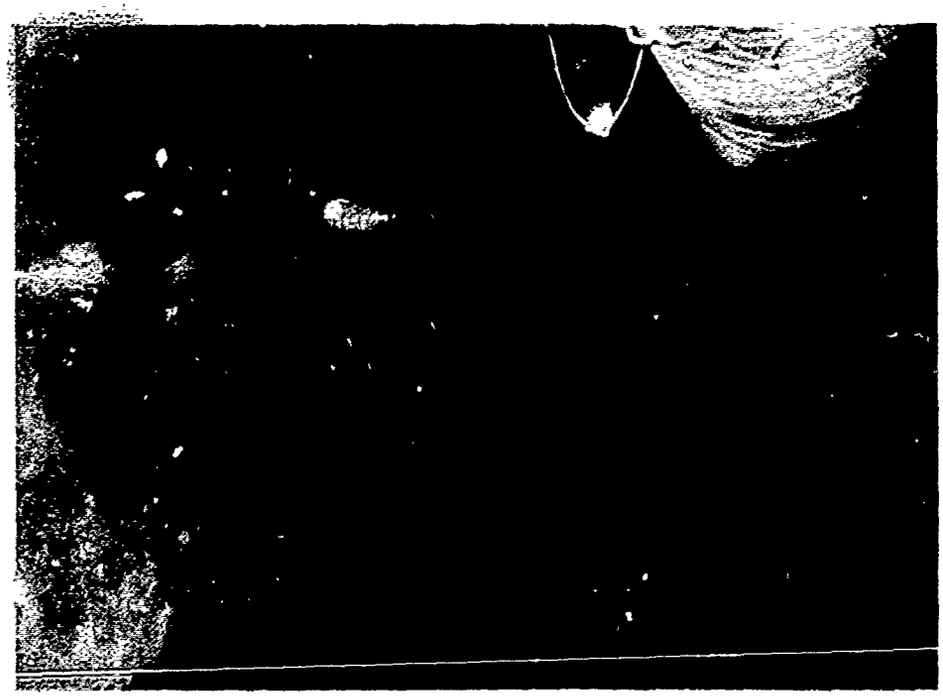


PHOTO NO. 36 - TUNNEL BIFURCATION - SOUTH ADIT - SOUTH DRIFT.

PHOTO NO. 37 - PROBLEM AREA - SHOTCRETE SLUFFING BELOW SPRINGLINE EXPOSING MUDSTONE. SOUTH ADIT, STATION 0+86.

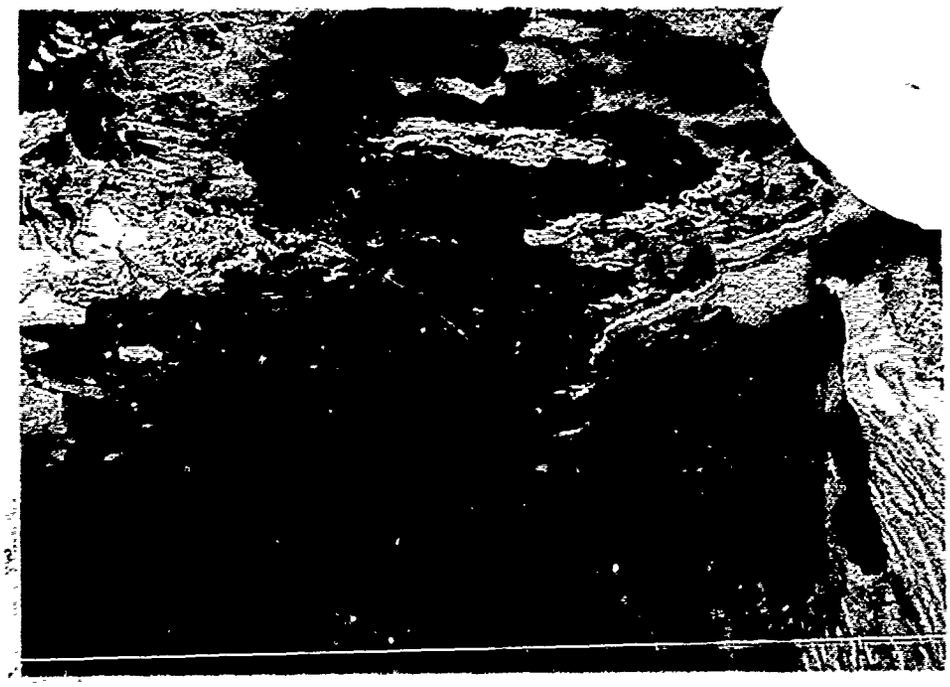


PHOTO NO. 38 - ATYPICAL CONDITION - MUDSTONE SECTION ENCOUNTERED ALONG CROWN IN NORTH ADIT BETWEEN STATION S 7+08 AND 7+64.

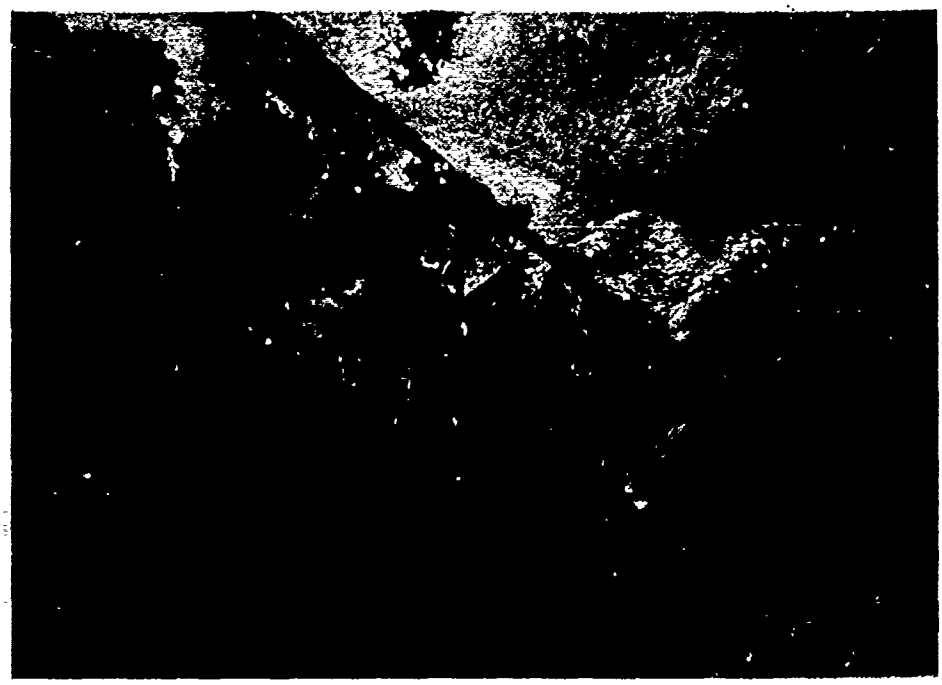


PHOTO NO. 39 - SEEPAGE AREA ON TUNNEL CROWN (STATION 2+90, NORTH ADIT). NOTE: THIS IS ONE OF A VERY FEW AREAS WHERE SEEPAGE WAS ENCOUNTERED ON CROWN.

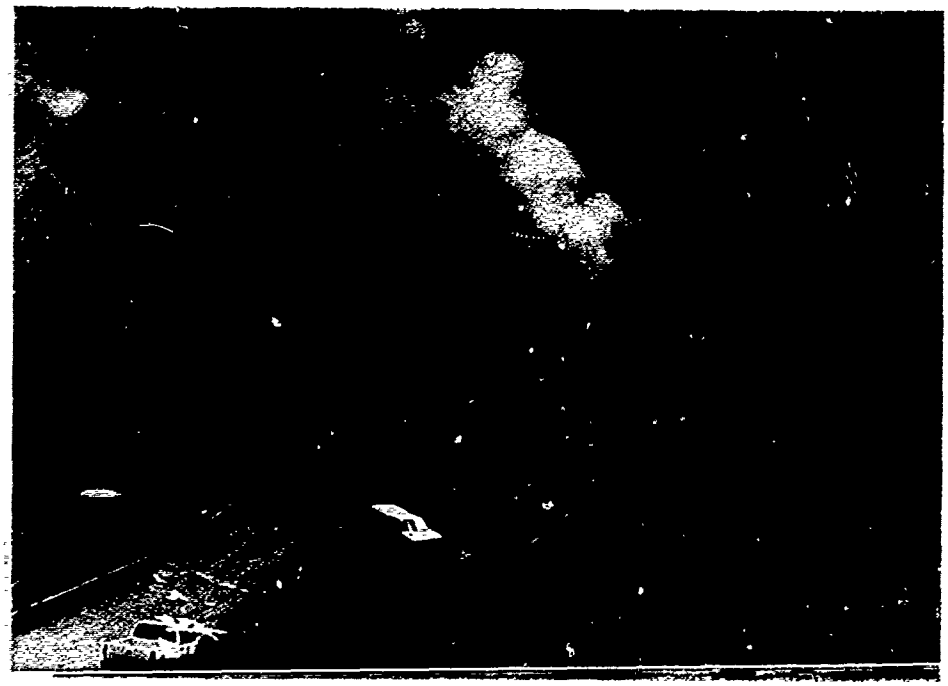


PHOTO NO. 40 - ADIT CONSTRUCTION SOUTH ADIT.

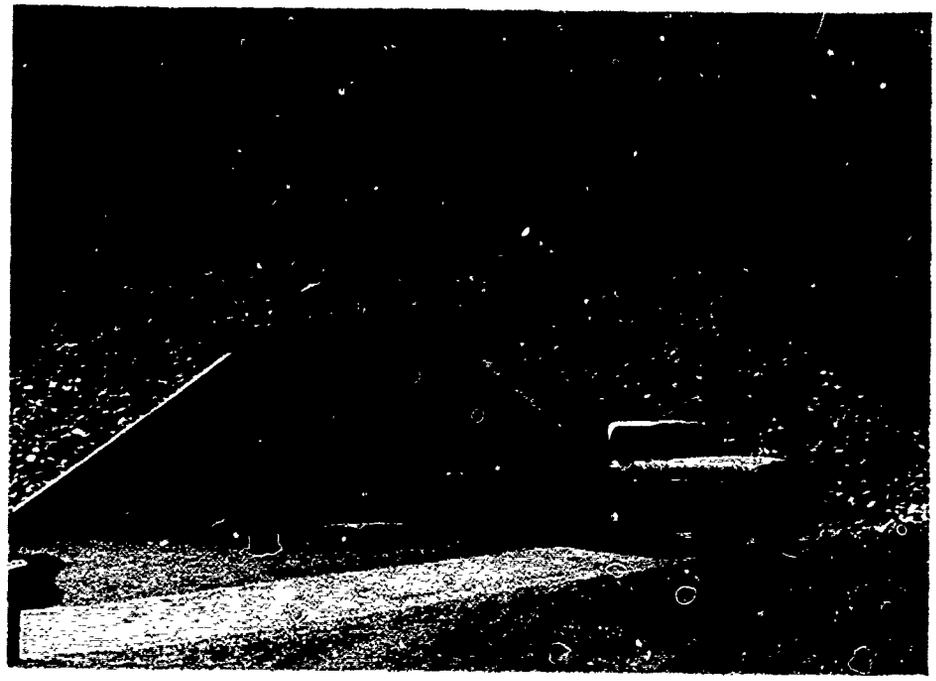
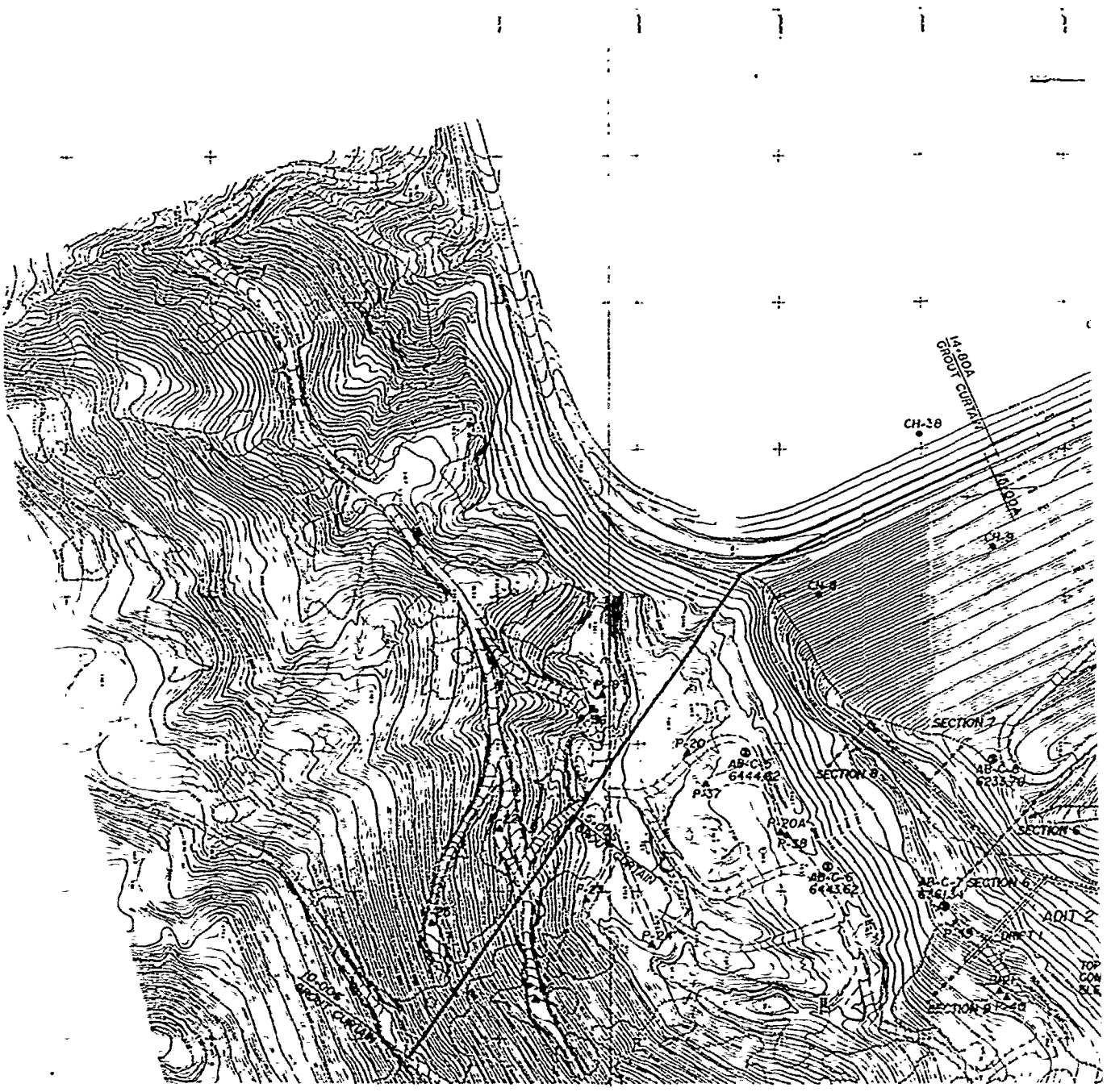


PHOTO NO. 41 - COMPLETED PERMANENT PORTAL STRUCTURE. (TYPICAL BOTH PORTALS, SOUTH SHOWN.)

PHOTO NO. 42 - CONCRETE WATERWAY CARRYING SOUTH ADIT DISCHARGE TO RIO CHAMA.

APPENDIX 10

PERTINENT DESIGN PLANS



LEGEND

LEGEND

CH-8 — CORE HOLES (EXISTING)

AB-C-7 — CORE HOLES DRILLED IN 1957

P-9 — EXISTING PIEZOMETERS

CONTOUR INTERVAL 2 FE

NATIONAL GEODETIC VERTICAL

COMPILED BY PHOTOGRAMMETRIC

DATE OF PHOTOGRAPHY APRIL

SCALE OF PHOTOGRAPHY

CAMERA F.L. 153mm

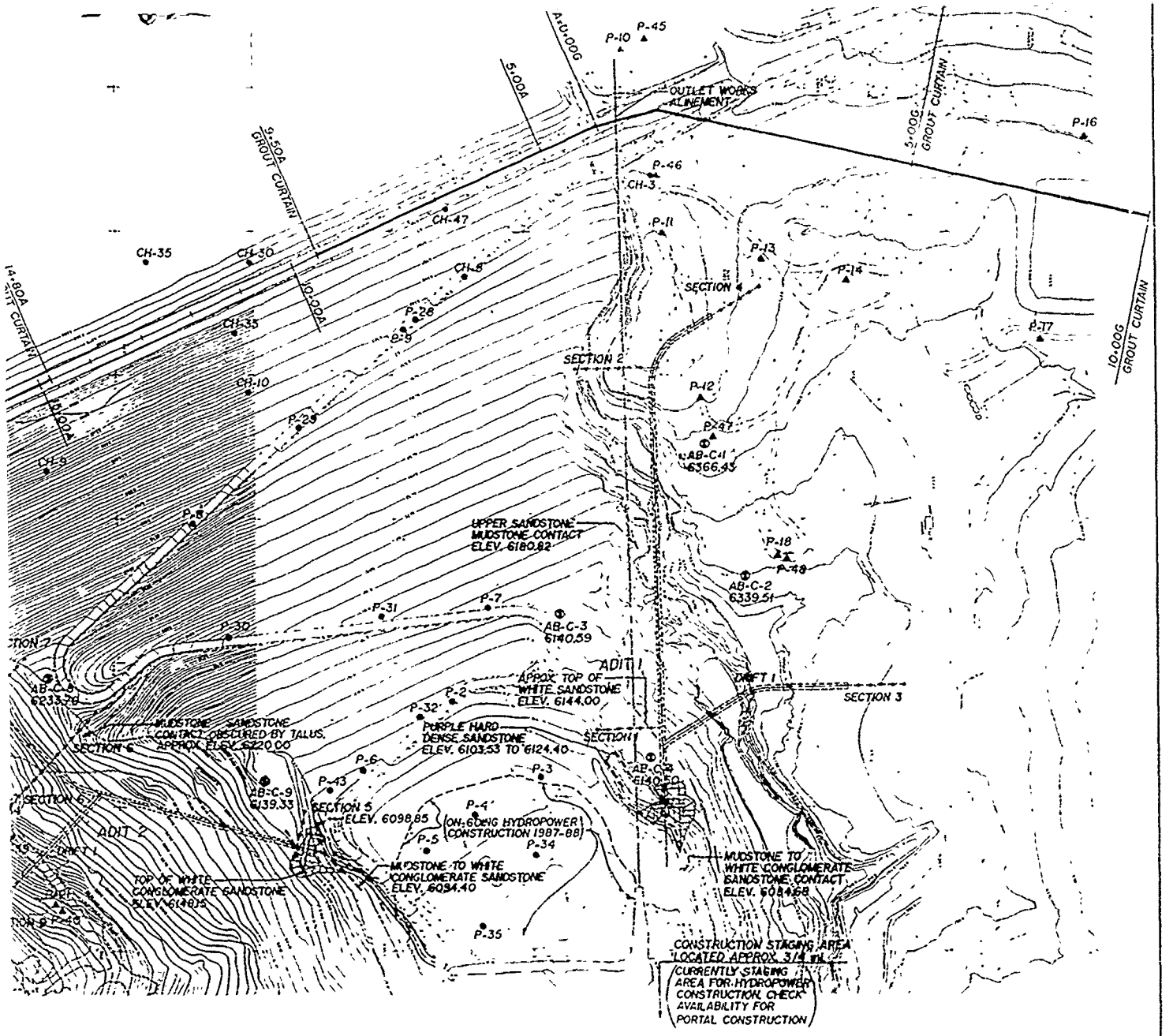
THIS MAP COMPLIES WITH

NATIONAL MAP ACCURACY STA

TOPOGRAPHIC MAPPING BY:

GOGGLE & POULS ENGINEERING INC

VALUE EN



Scale 1 = 100

CONTOUR INTERVAL 2 FEET
NATIONAL GEODETIC VERTICAL DATUM
COMPILED BY PHOTOGRAMMETRIC METHODS
DATE OF PHOTOGRAPHY APRIL 1 1987
SCALE OF PHOTOGRAPHY 1:7000
CAMERA F.L. 153mm
THIS MAP COMPLIES WITH THE NATIONAL MAP ACCURACY STANDARDS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U. S. ARMY ENGINEER DISTRICT ALBUQUERQUE
CORPS OF ENGINEERS
ALBUQUERQUE NEW MEXICO

DESIGNED BY: R.B.C.
DRAWN BY: S.J.M.
CHECKED BY: DRCD

ABIQUIU RESERVOIR

CONTRACT NO. DACW47-86-D-0038

GENERAL PLAN AND CONSTRUCTION STAGING AREA

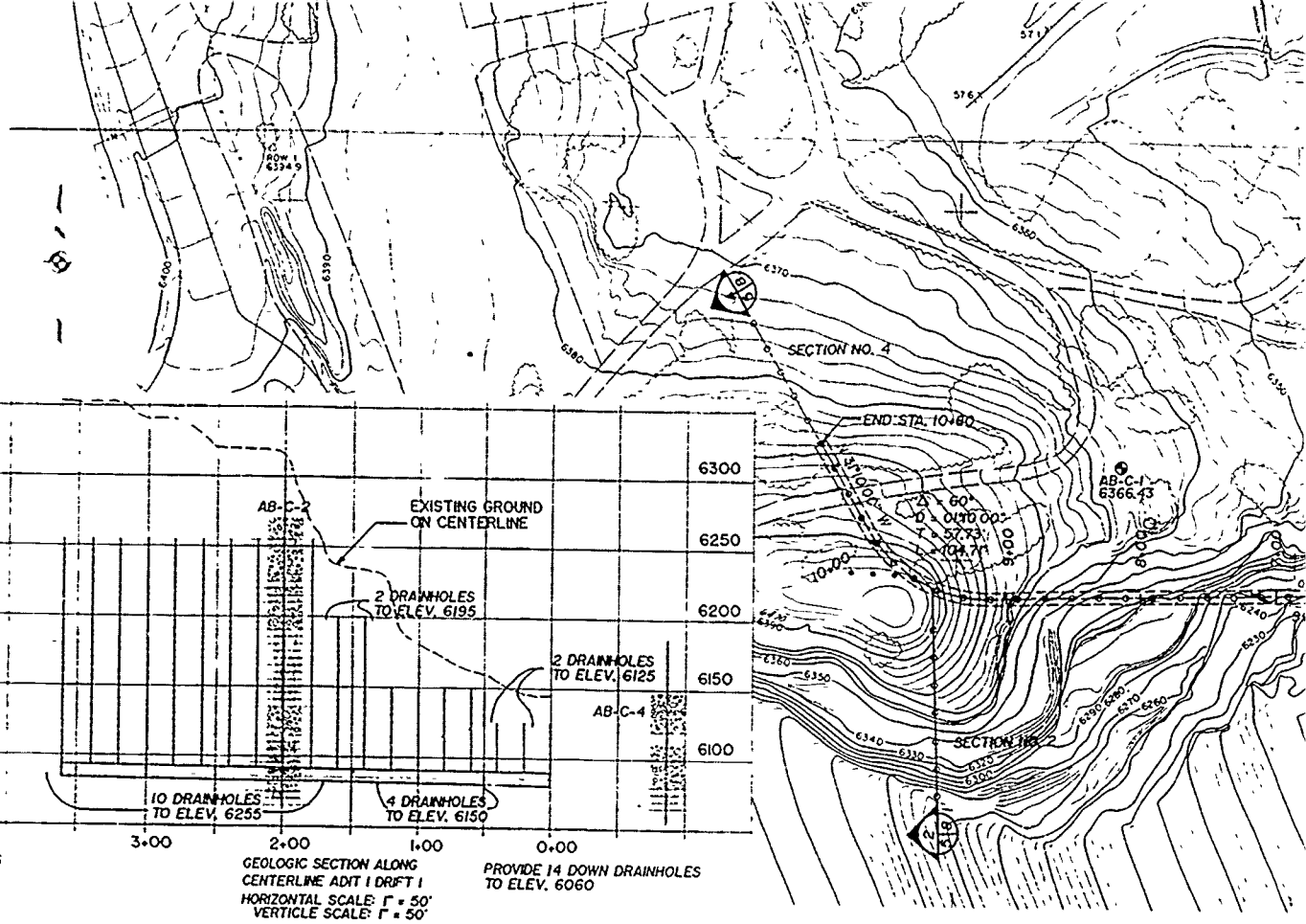
TO ACCOMPANY DM #20

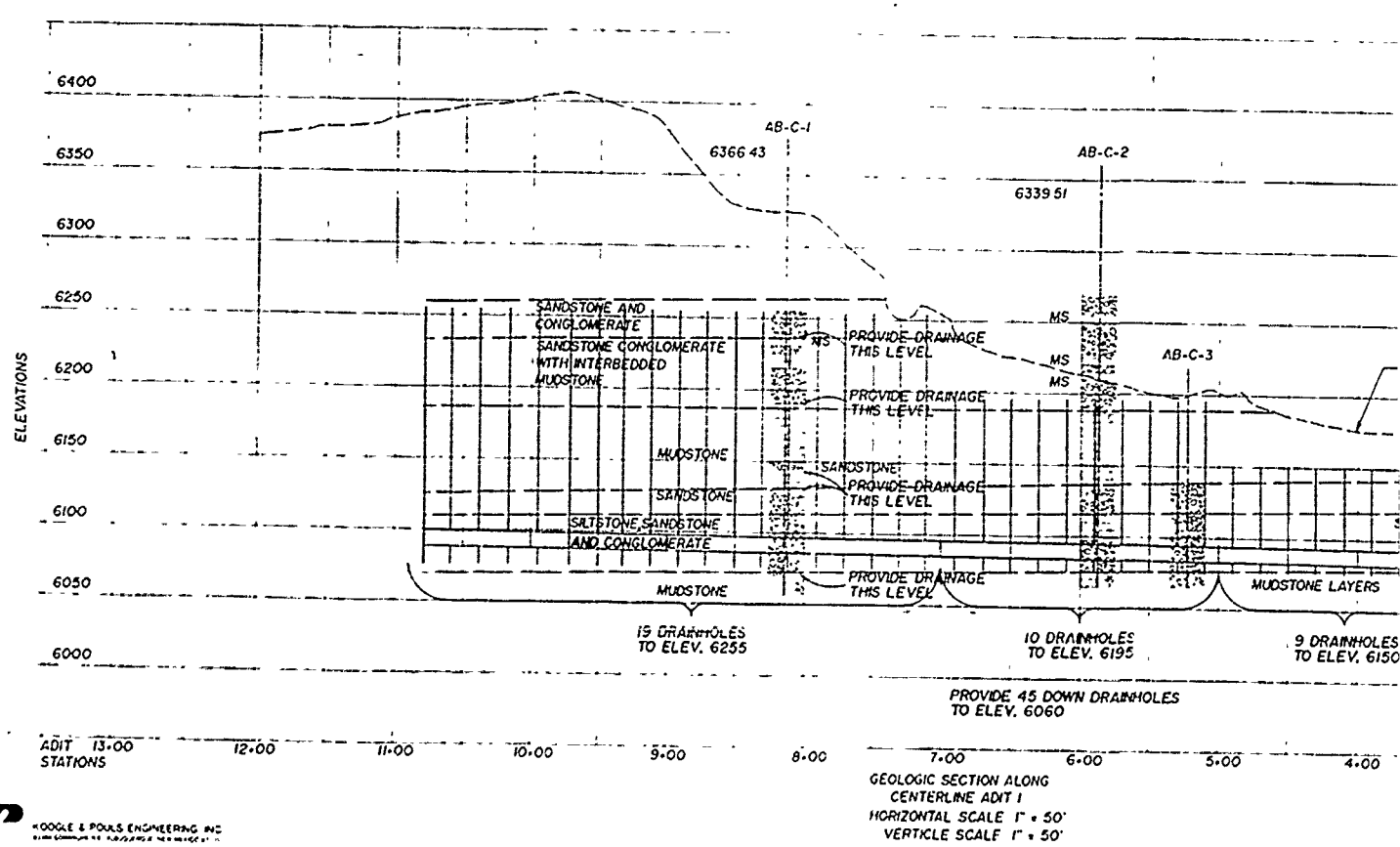
TIERRA ENGINEERING CONSULTANTS INC

DATE FEB 1 1988

FILE NUMBER RGAB-AA-DM-2
SHEET 2 OF 21

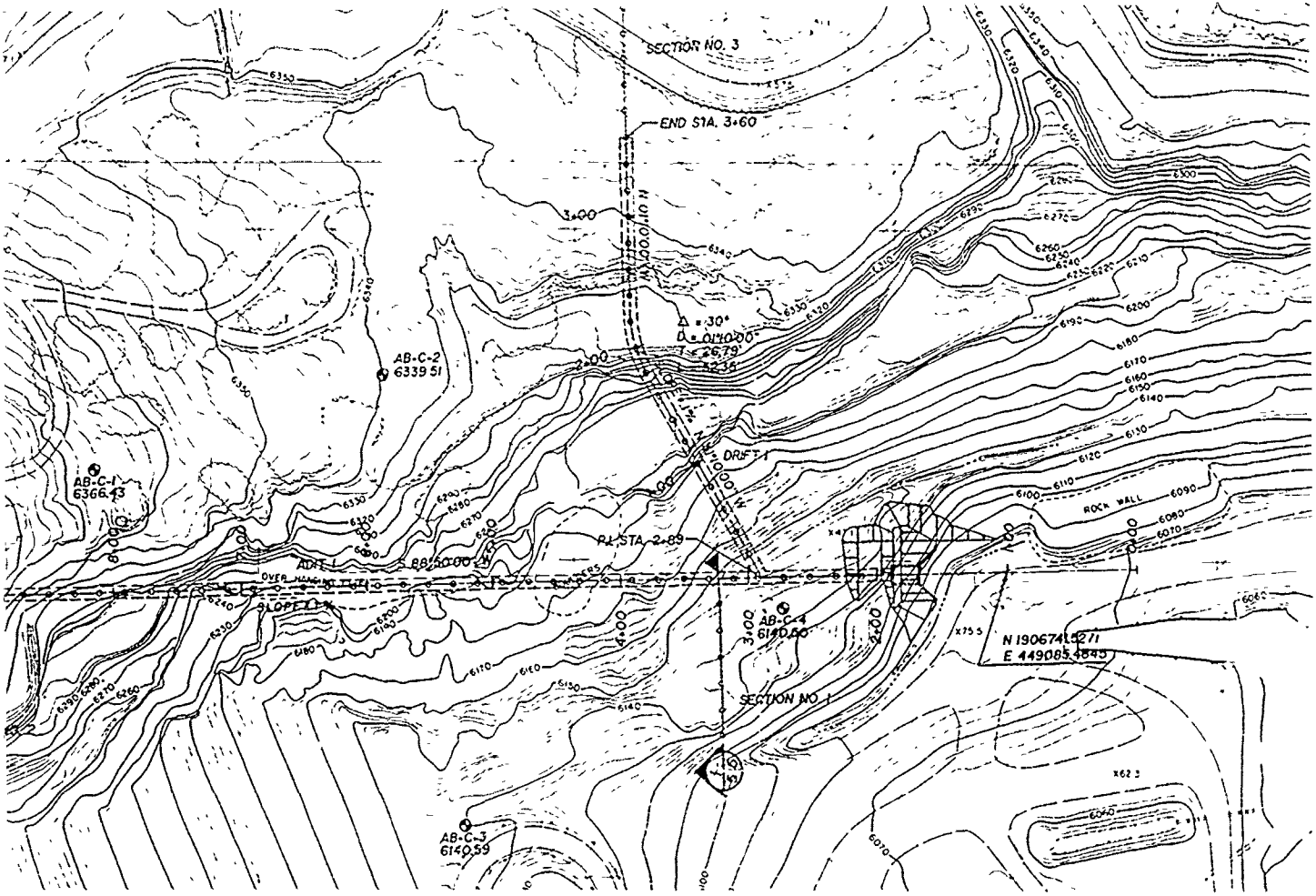
PLATE 2

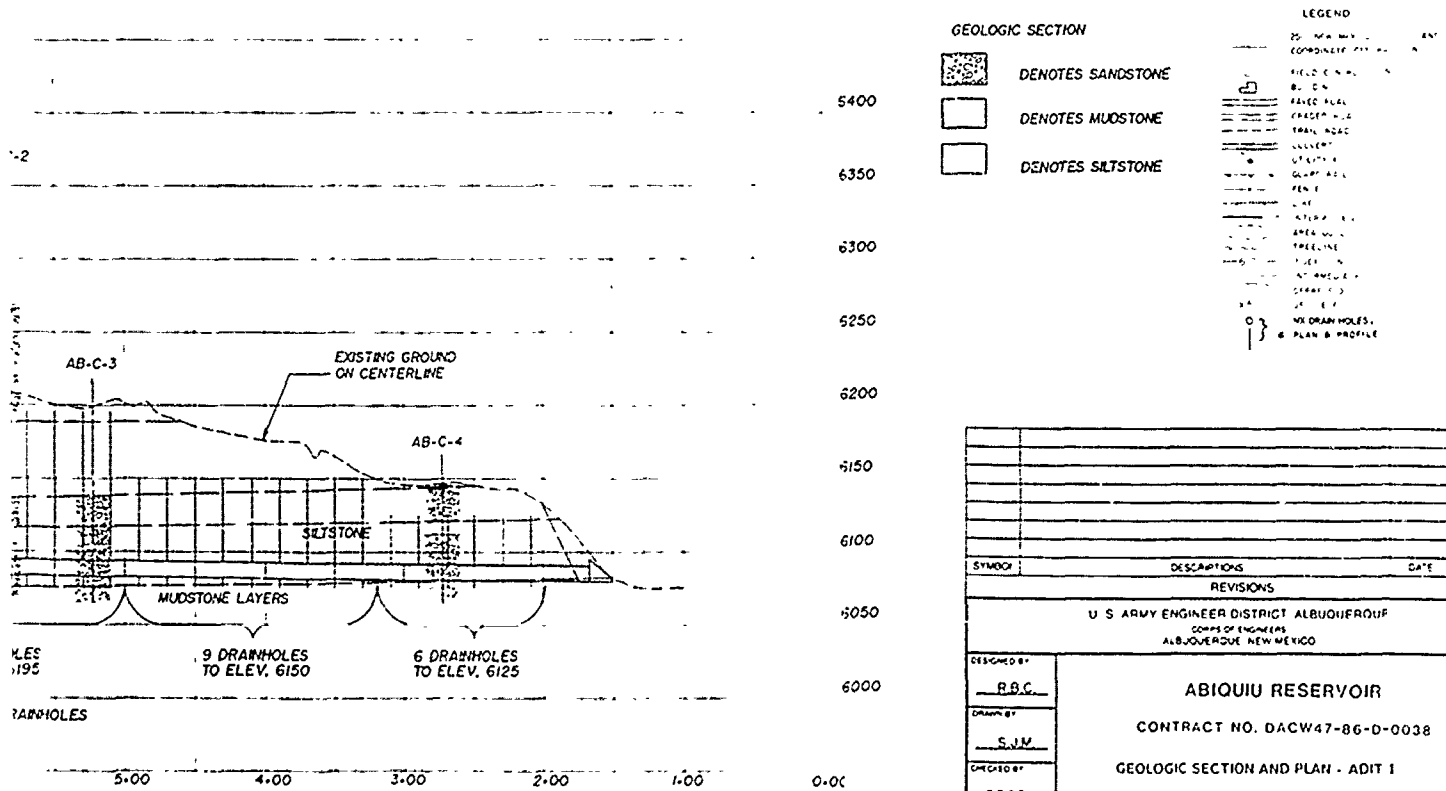




KOOGLE & POULS ENGINEERING INC

VALUE ENGINEERI





SYMBOL	DESCRIPTIONS	DATE	APPROVED
	REVISIONS		

U S ARMY ENGINEER DISTRICT ALBUQUERQUE
CORPS OF ENGINEERS
ALBUQUERQUE NEW MEXICO

DESIGNED BY: RBC
DRAWN BY: SJM
CHECKED BY: DRCD

ABIQUIU RESERVOIR

CONTRACT NO. DACW47-86-D-0038

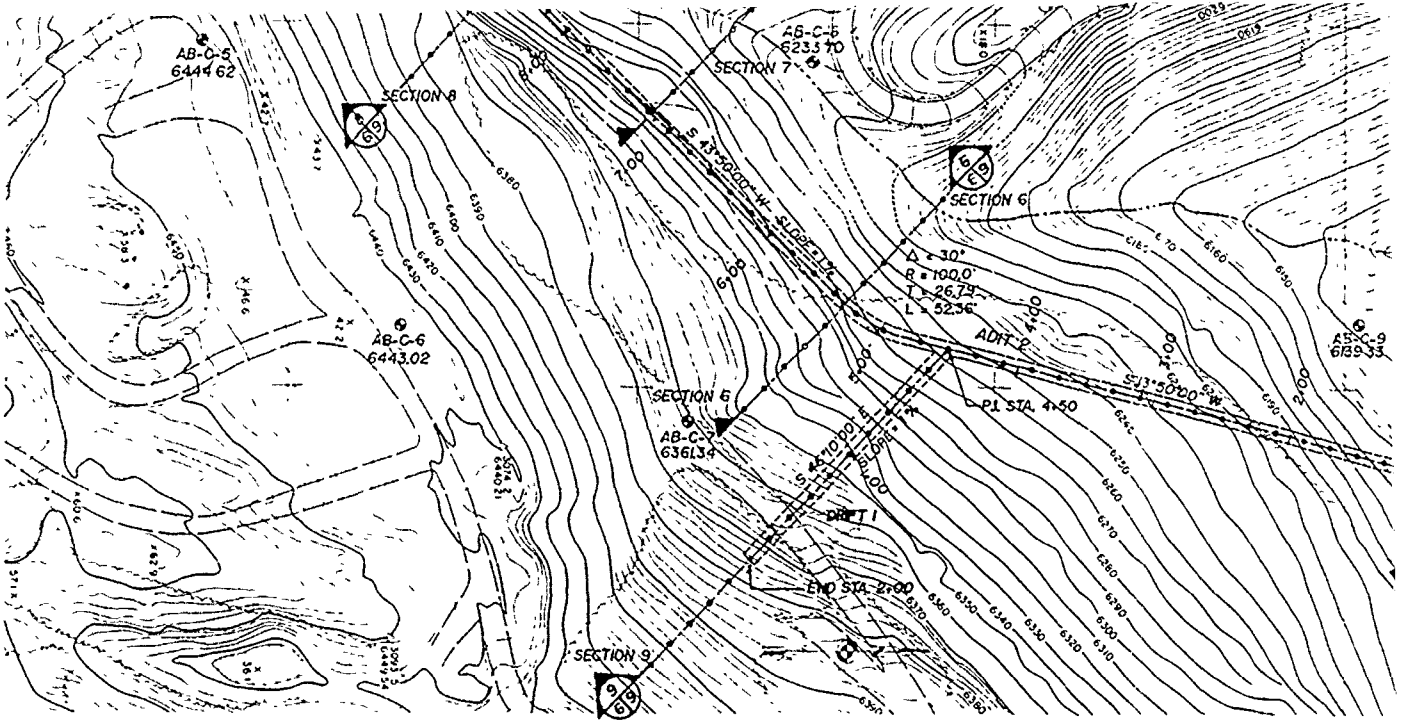
GEOLOGIC SECTION AND PLAN - ADIT 1

TO ACCOMPANY C W O

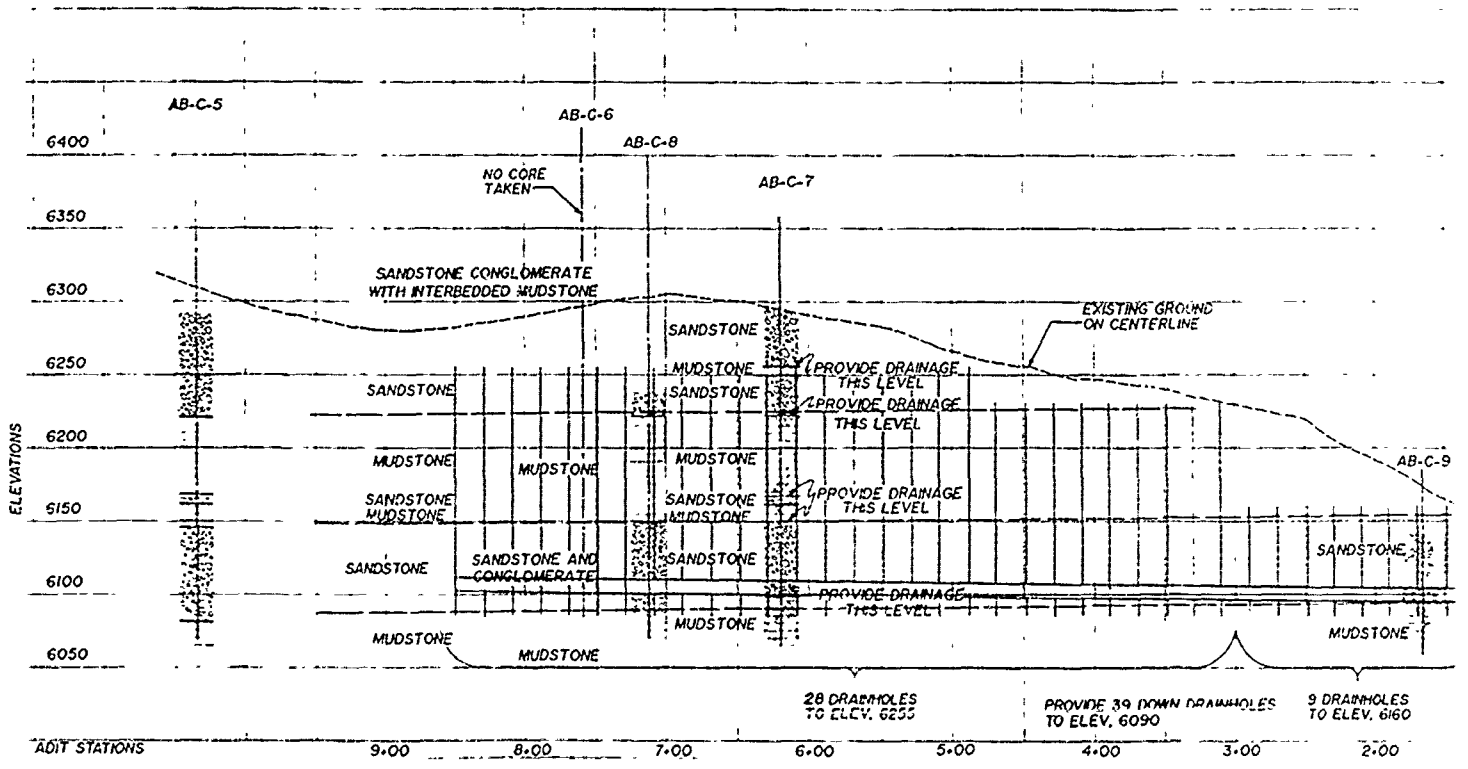
DATE

FILE NUMBER
RGAB-AA-DM-5
SHEET 5 OF 21

PLATE
5

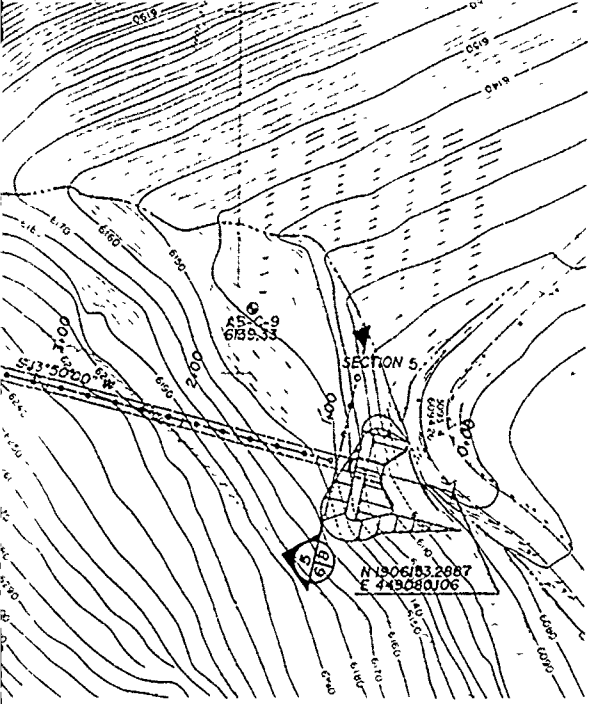


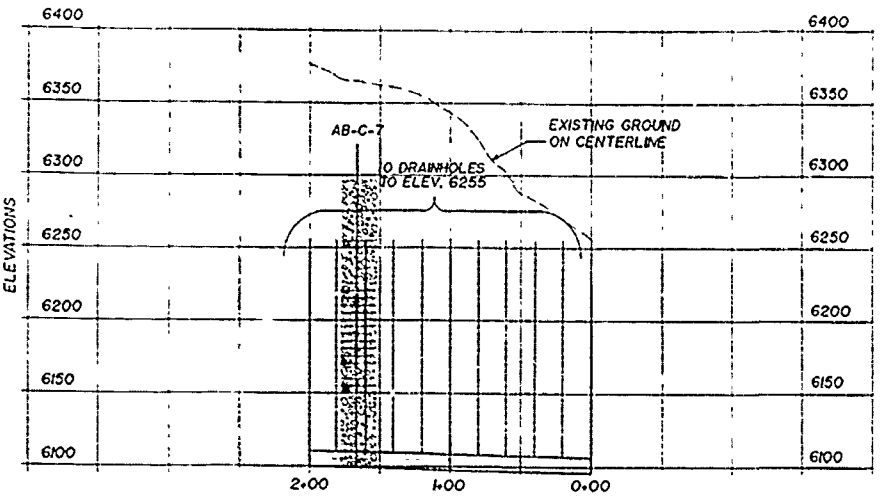
PLAN VIEW
ADIT 2
SCALE: 1" = 50'



GEOLOGIC SECTION ALONG
CENTERLINE ADIT 2
HORIZONTAL SCALE 1" = 50
VERTICLE SCALE 1" = 50'

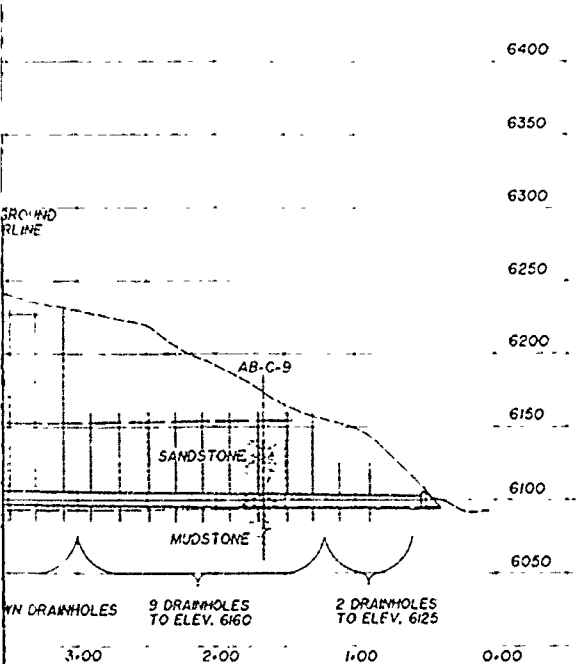
KOLE & POULS ENGINEERING INC





PROVIDE 10 DOWN DRAINHOLES TO ELEV. 6090

GEOLOGIC SECTION ALONG CENTERLINE ADIT 2 DRIFT 1
HORIZONTAL SCALE: 1" = 50'
VERTICLE SCALE: 1" = 50'



GEOLOGIC SECTION

DENOTES SANDSTONE

DENOTES MUDSTONE

DENOTES SILTSTONE

LEGEND

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U S ARMY ENGINEER DISTRICT ALBUQUERQUE
CORPS OF ENGINEERS
ALBUQUERQUE NEW MEXICO

DESIGNED BY: R.B.C.
DRAWN BY: S.J.M.
CHECKED BY: DRCD

ABIQUIU RESERVOIR

CONTRACT NO DACW47-86-D-0038

GEOLOGIC SECTION AND PLAN - ADIT 2

TO ACCOMPANY D.M. #21

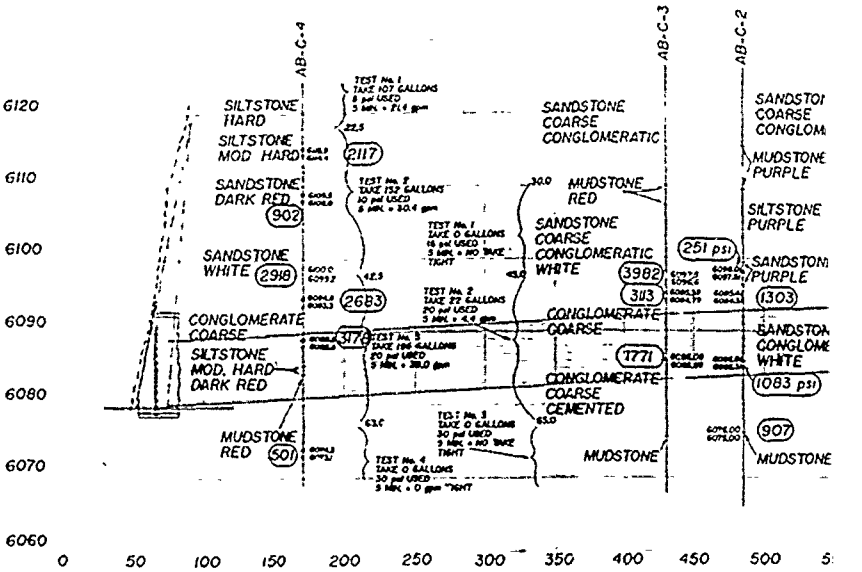
TIERRA ENGINEERING CONSULTANTS INC

DATE

FILE NUMBER
RGAB-AA-DM- 6
SHEET 6 OF 21

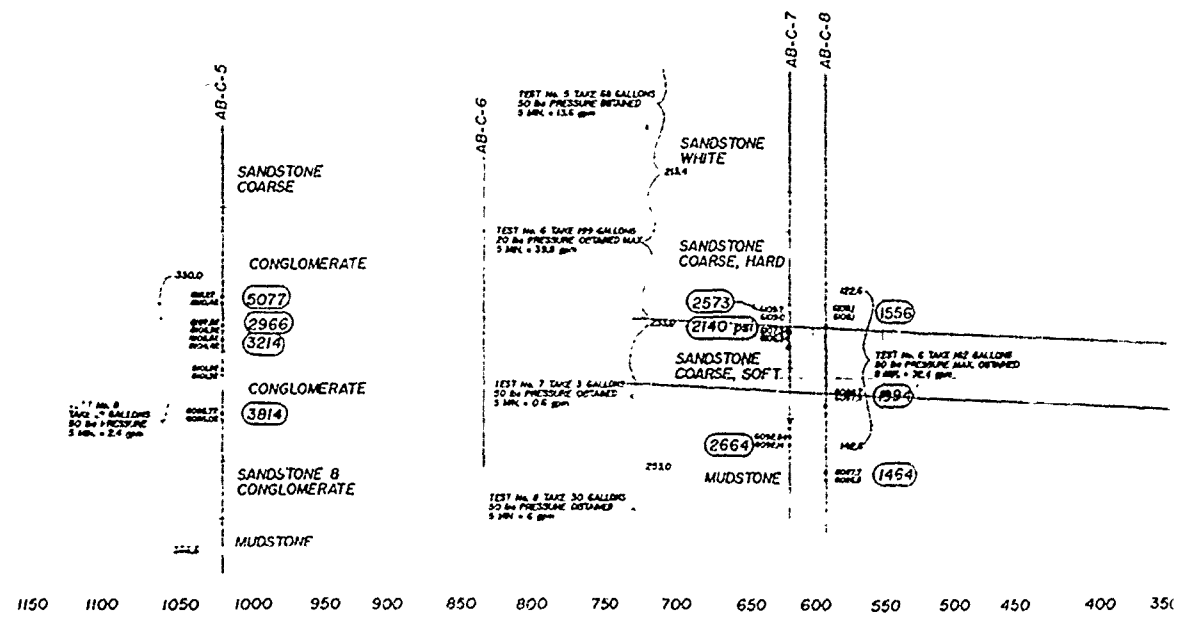
PLATE
6

ADIT No 1



HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

ADIT No. 2

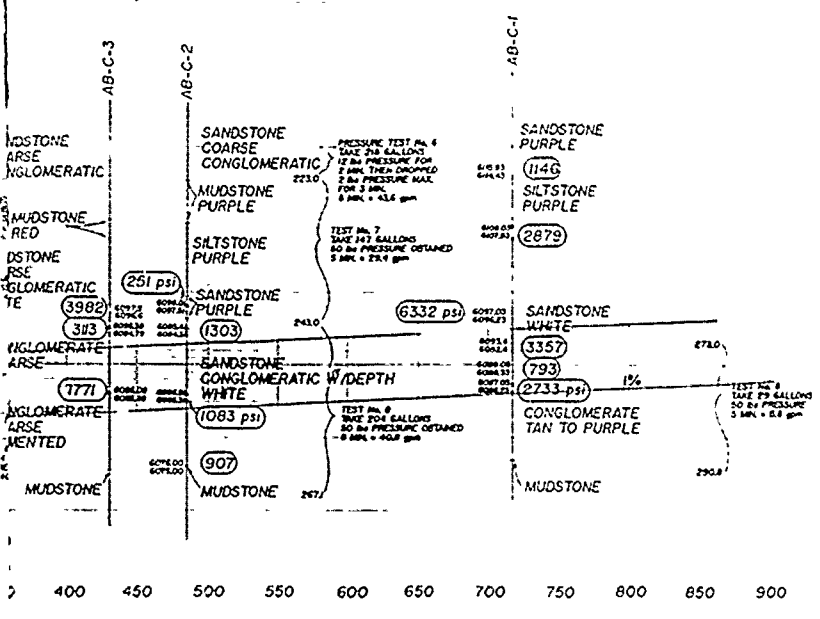


HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

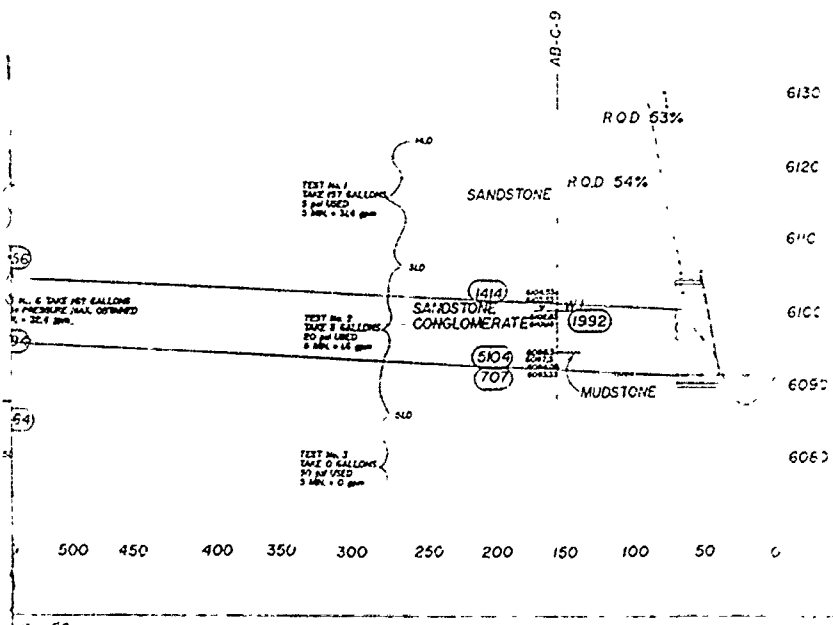
LEGEND

(2907) UNCONFINED COMPRES

ADIT No. 1



HORIZONTAL SCALE- 1" = 50'
VERTICAL SCALE- 1" = 10'



1" = 50'
1" = 10'

LEGEND

(2907) UNCONFINED COMPRESSIVE STRENGTH

GRAPHIC SCALE

0 25 50 100 150

1"=50

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U S ARMY ENGINEER DISTRICT ALBUQUERQUE
ALBUQUERQUE NEW MEXICO

DESIGNED BY R.B.C.
DRAWN BY S.J.M.
CHECKED BY D.+C.D.

ABIQUIU RESERVOIR

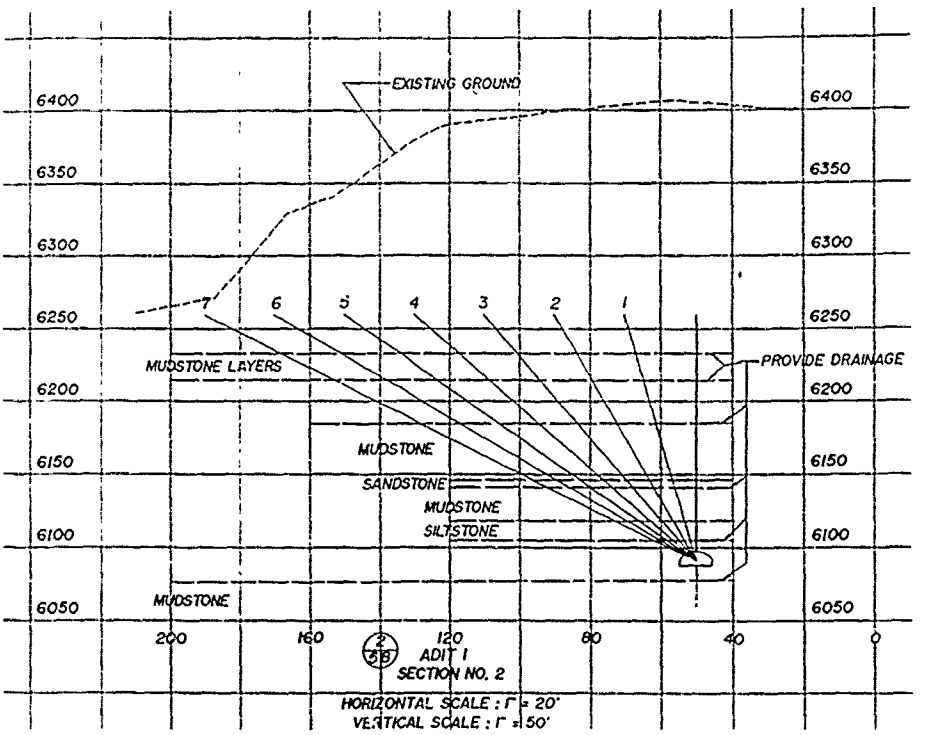
CONTRACT NO DACW47-86-D-0038

ENLARGED GEOLOGIC SECTIONS OF ADITS AND TESTING

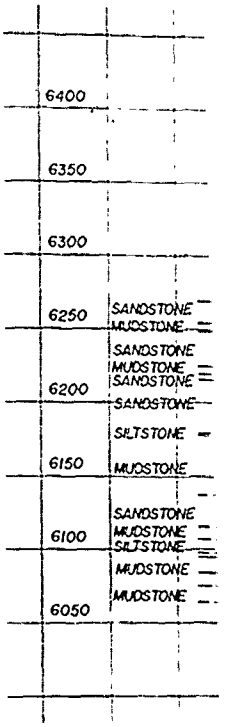
DATE

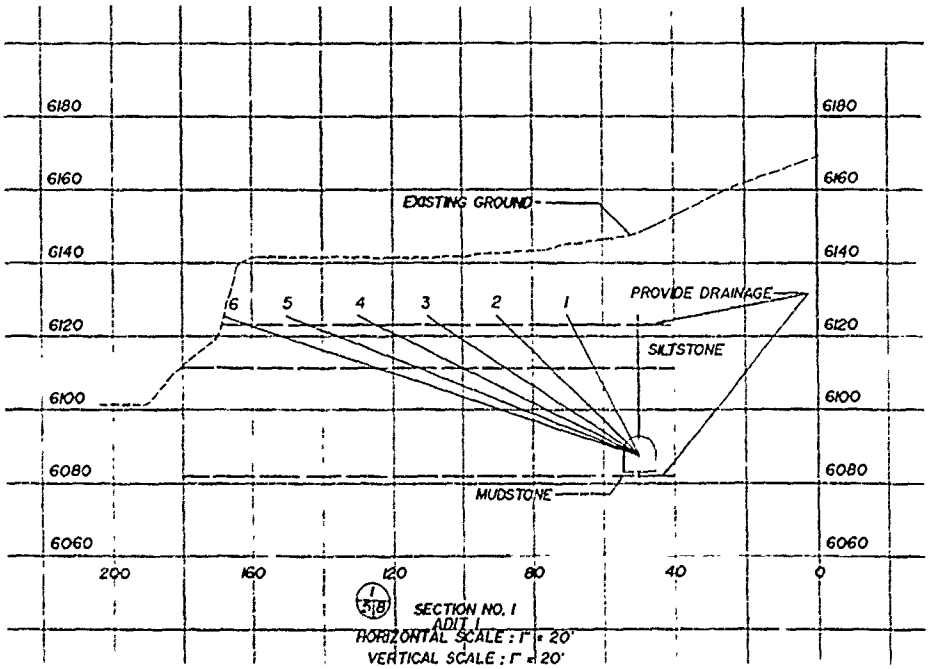
FILE NUMBER RGAB-AA-DM-7

PLATE 7

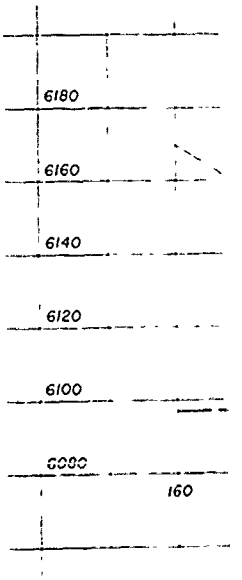


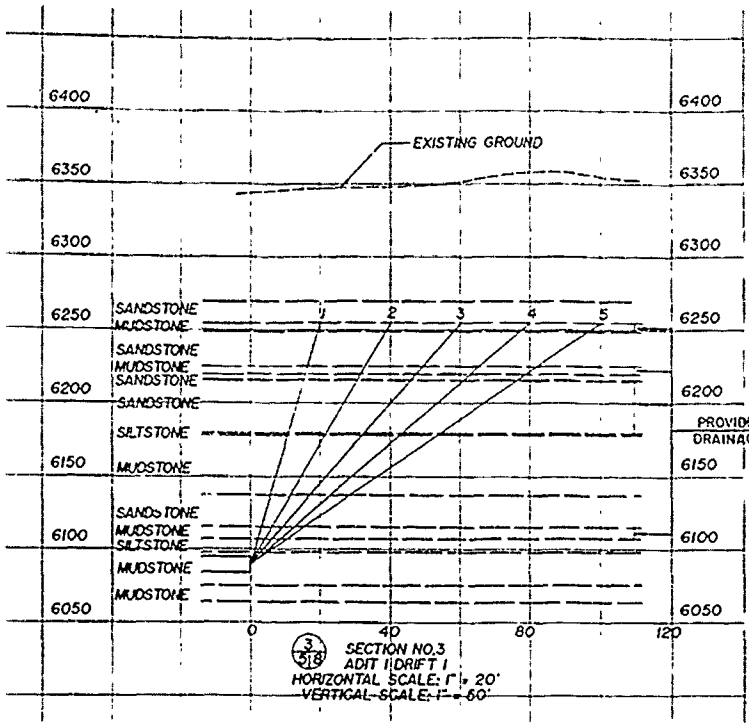
2/18
ADIT 1
SECTION NO. 2
HORIZONTAL SCALE : 1" = 20'
VERTICAL SCALE : 1" = 50'



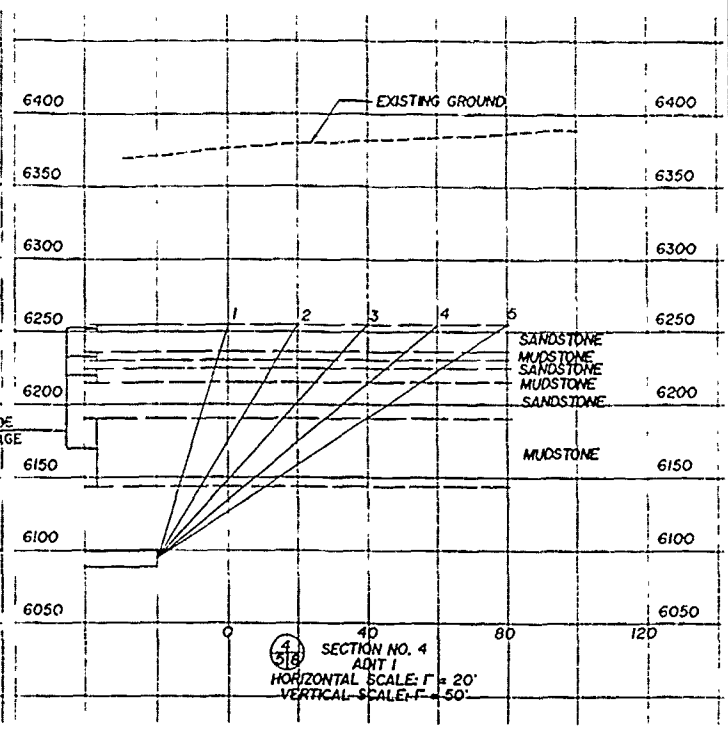


1/18
SECTION NO. 1
ADIT 1
HORIZONTAL SCALE : 1" = 20'
VERTICAL SCALE : 1" = 20'

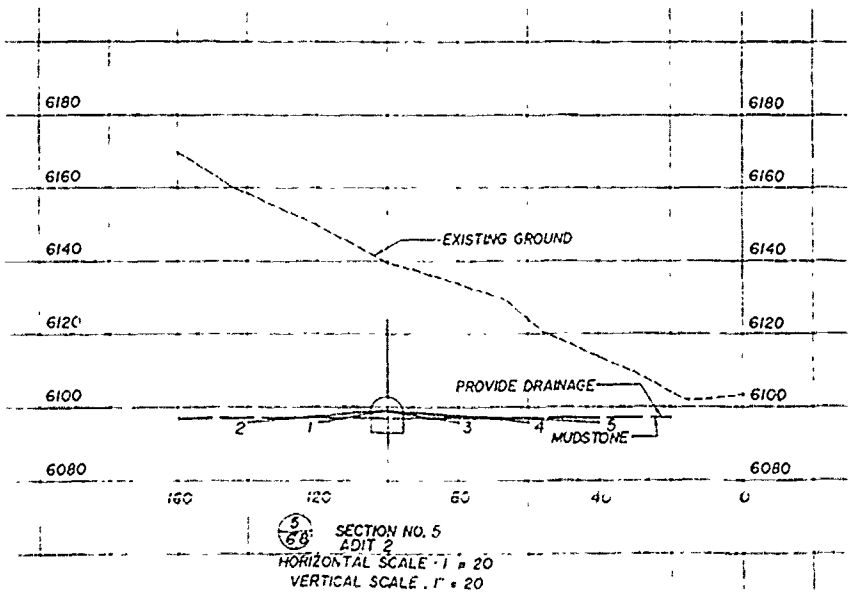




3/5/8 SECTION NO.3
ADIT I DRIFT I
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 50'



4/5/8 SECTION NO. 4
ADIT I
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 50'



5/6/8 SECTION NO. 5
ADIT 2
HORIZONTAL SCALE: 1" = 20
VERTICAL SCALE: 1" = 20

GRAPHIC SCALE
1"=20' 0 10 20 40 60

GRAPHIC SCALE
1"=50 0 25 50 100 150

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE
CORPS OF ENGINEERS
ALBUQUERQUE NEW MEXICO

DESIGNED BY: DRCO
DRAWN BY: SJM
CHECKED BY: RBC

ABIQUIU RESERVOIR

CONTRACT NO DACW47-86-D-0038

DRAIN HOLE SECTIONS 1 THRU 5

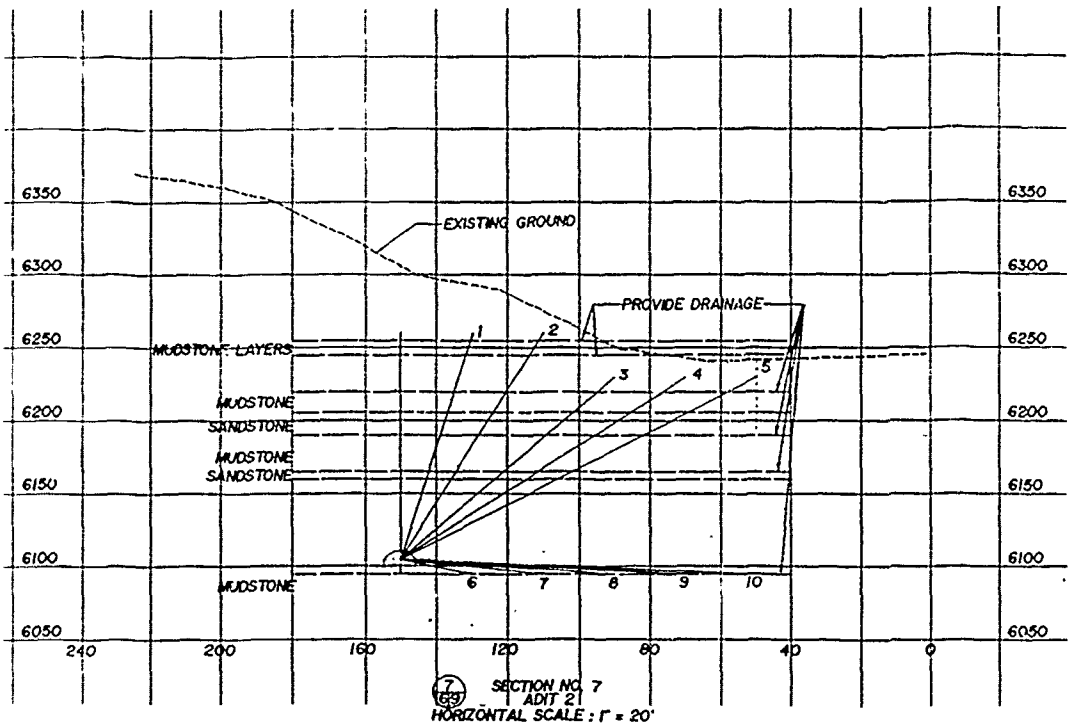
TO ACCOMPANY D.M. #20

TIERRA ENGINEERS CONSULTANTS INC

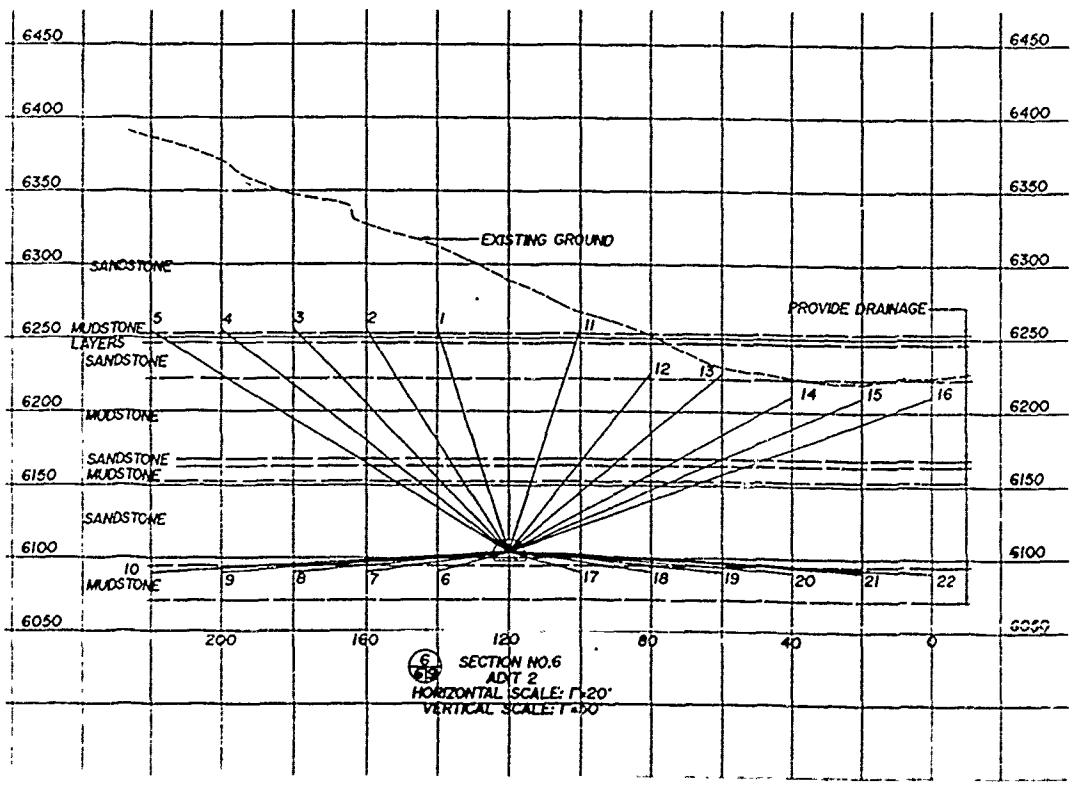
DATE

FILE NUMBER RGAB-AA-DM-8
SHEET 8 OF 21

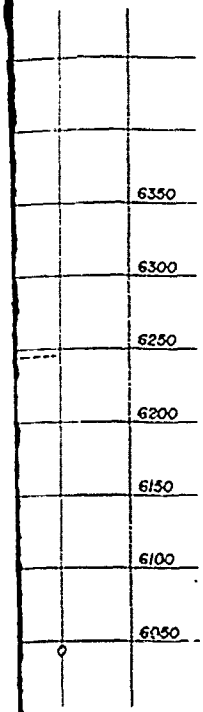
PLATE 8

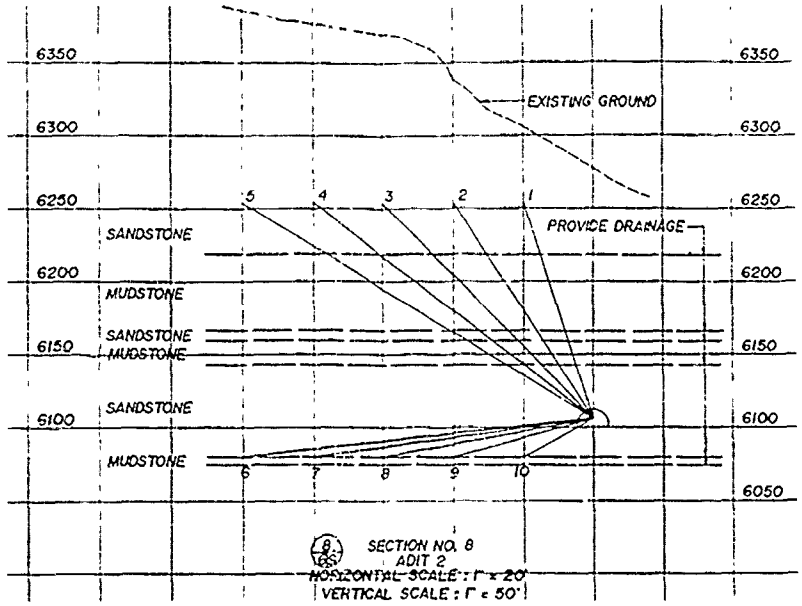


7/69 SECTION NO. 7
ADIT 2
HORIZONTAL SCALE : 1" = 20'
VERTICAL SCALE : 1" = 50'

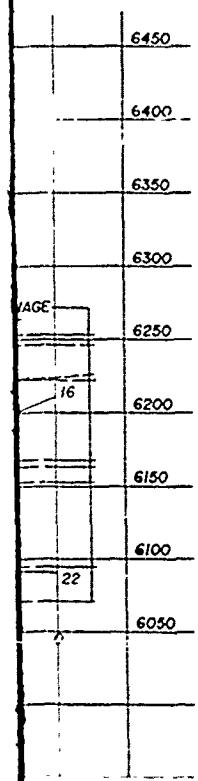


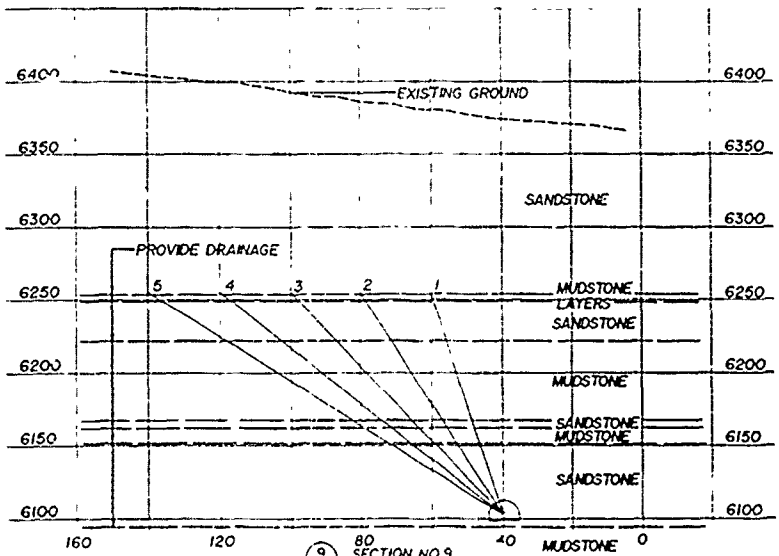
6/69 SECTION NO.6
ADIT 2
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=50'





8 SECTION NO. 8
ADIT 2
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 50'





9 SECTION NO 9
ADIT 2
HORIZONTAL SCALE 1"=20'
VERTICAL SCALE 1"=50'

GRAPHIC SCALE
0 10 20 40 60
1"=20

GRAPHIC SCALE
0 25 50 100 150
1"=50

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

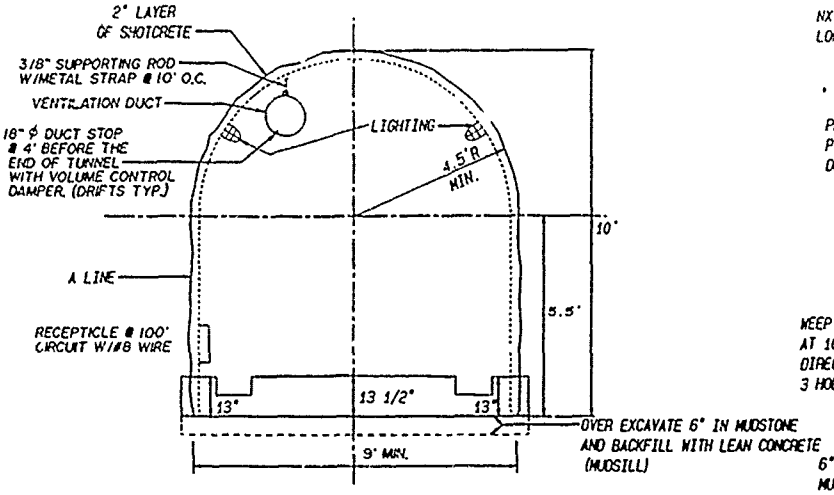
U. S. ARMY ENGINEER DISTRICT ALBUQUERQUE
CORPS OF ENGINEERS
ALBUQUERQUE NEW MEXICO

DESIGNED BY DRCD	ABIQUIU RESERVOIR
DRAWN BY S.J.M.	CONTRACT NO DACW47-86-D-0038
CHECKED BY RBC	DRAIN HOLE SECTIONS 6 THRU 9

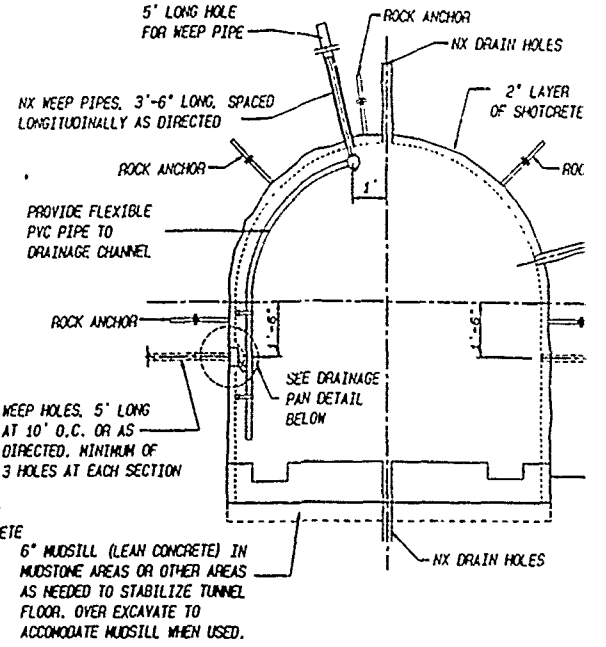
TO ACCOMPANY O.M. #20
HYDRA ENGINEERING CONSULTANTS, P.A.
DATE 11 11 1999

FILE NUMBER RGAB-AA-DM-9
SHEET 9 OF 21

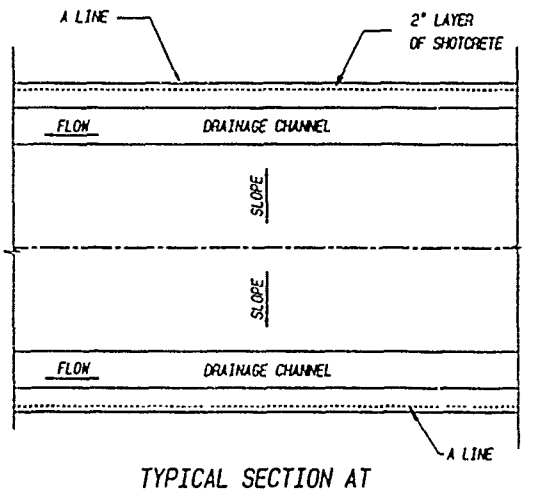
PLATE 9



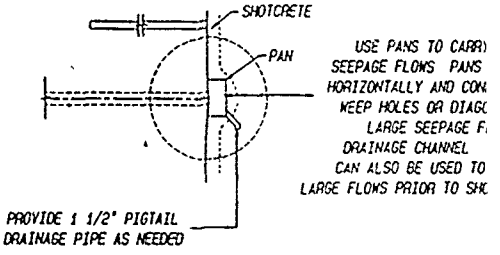
TYPICAL TUNNEL SECTION
WITH UTILITIES
SCALE: 1"=2'



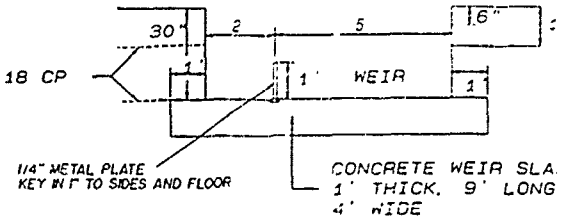
UNSUPPORTED OR ROCK
REINFORCEMENT
SCALE: 1"=2'



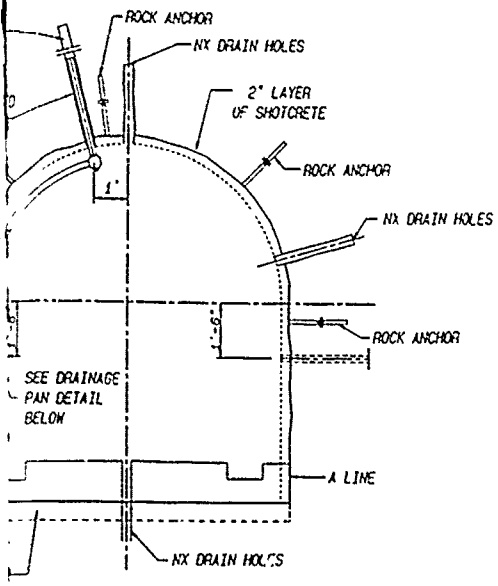
TYPICAL SECTION AT
2 DRAINAGE CHANNELS
SCALE: 1"=2'



DRAINAGE PAN DETAIL
NOT TO SCALE

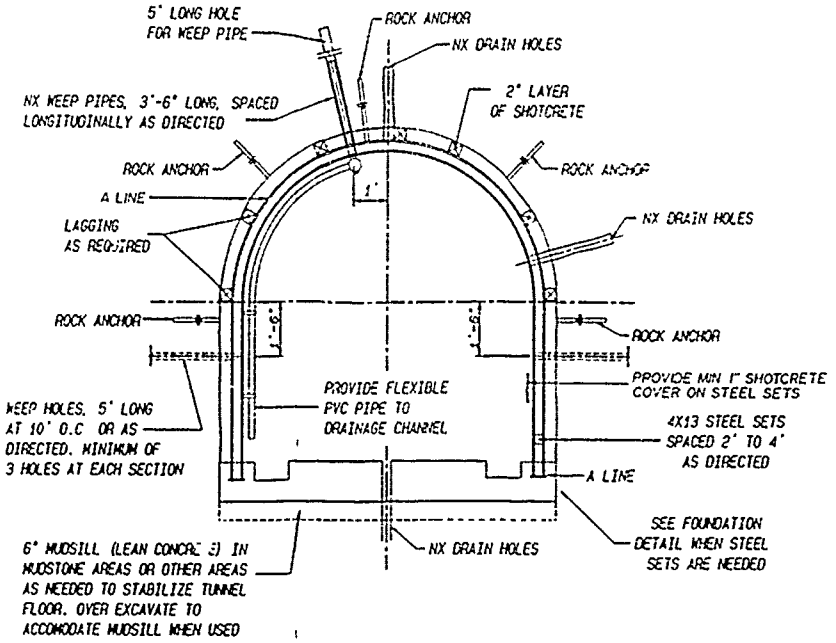


CONCRETE WEIR DETAIL
SCALE 1"=2'



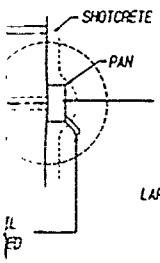
UNSUPPORTED OR ROCK REINFORCEMENT

SCALE: 1"=2'



STEEL RIB SUPPORTED

SCALE: 1"=2'



USE PANS TO CARRY AWAY EXCESS SEEPAGE FLOWS. PANS MAY BE ORIENTED HORIZONTALLY AND CONNECT SEVERAL WEEP HOLES OR DIAGONALLY TO CARRY LARGE SEEPAGE FLOWS TO THE DRAINAGE CHANNEL. THIS TECHNIQUE CAN ALSO BE USED TO DRY AREAS WITH LARGE FLOWS PRIOR TO SHOTCRETE APPLICATION.

GE PAN DETAIL

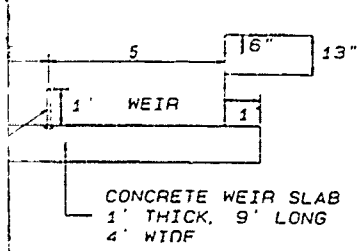
C" TO SCALE

ESTIMATED QUANTITIES
(PER LIN FT. OF TUNNEL)

ITEMS	ROCK REINFORCEMENT OR STEEL RIB SUPPORTED
EXCAVATION TO "A" LINE	3.011 CU YDS.
CONCRETE FLOOR	.331 CU. YDS.
SHOTCRETE	4.19 CU FT.
CHANNEL REINFORCEMENT	
WEEP HOLES	1.5 LIN. FT

NOTES

FOR PLAN AND PROFILE, SEE PLATES 5 & 6
FOR DETAILS OF TYPICAL STEEL RIB SUPPORTS AND ROCK REINFORCEMENT, SEE PLATES 12 & 13
FOR MISCELLANEOUS TUNNEL REQUIREMENTS, SEE THIS PLATE
DRILL HOLES FOR WEEP HOLES AND INSTALL WEEP PIPES AFTER THE SHOTCRETE LINING IS IN PLACE



CRETE WEIR DETAIL

SCALE 1"=2'

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U S ARMY ENGINEER DISTRICT, ALBUQUERQUE
CORPS OF ENGINEERS
ALBUQUERQUE NEW MEXICO

DESIGNED BY R.B.C.
DRAWN BY S.J.M.
CHECKED BY DRCO

ABIQUIU RESERVOIR

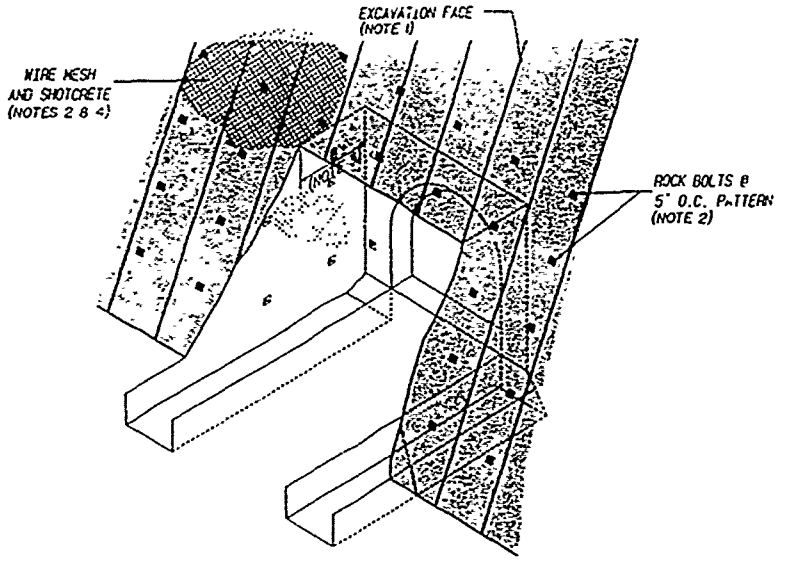
CONTRACT NO. DACW47-86-D-0038

TYPICAL ADIT SECTIONS

TO ACCOMPANY C.W. #23
TIERRA ENGINEERING CONSULTANTS INC
DATE

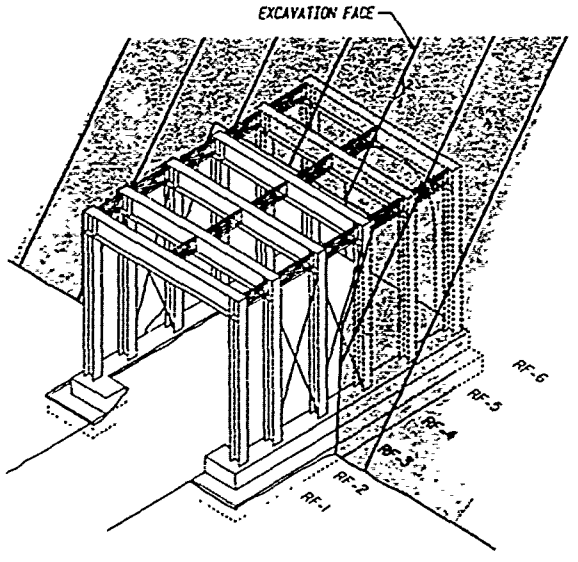
FILE NUMBER RGAB-AA-DM-11
SHEET 11 OF 21

PLATE 11



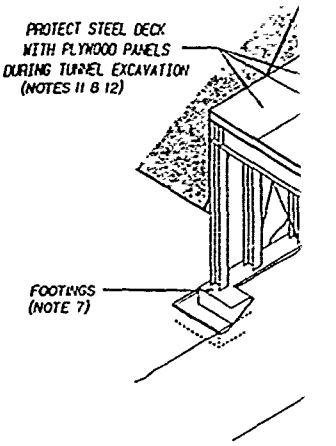
PARTIAL EXCAVATION SKETCH

NO SCALE

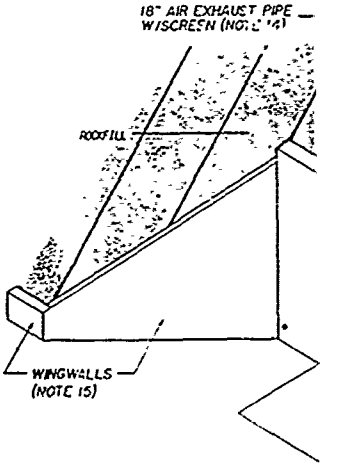


FRAMING ISOMETRIC SKETCH

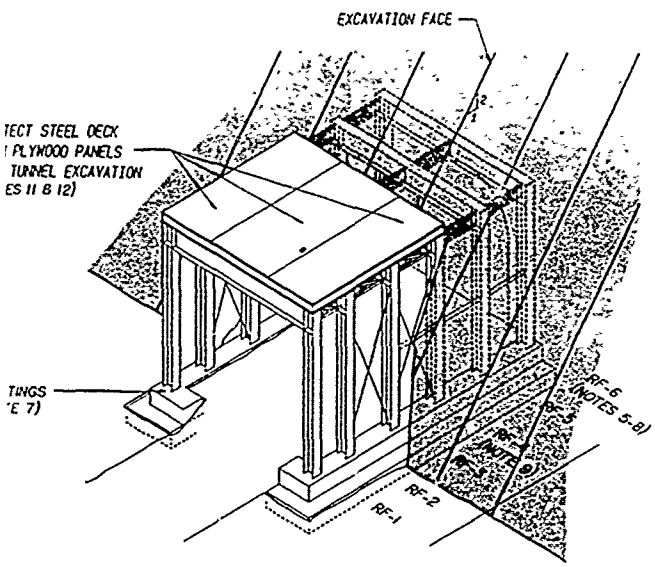
NO SCALE



DURING
ISO

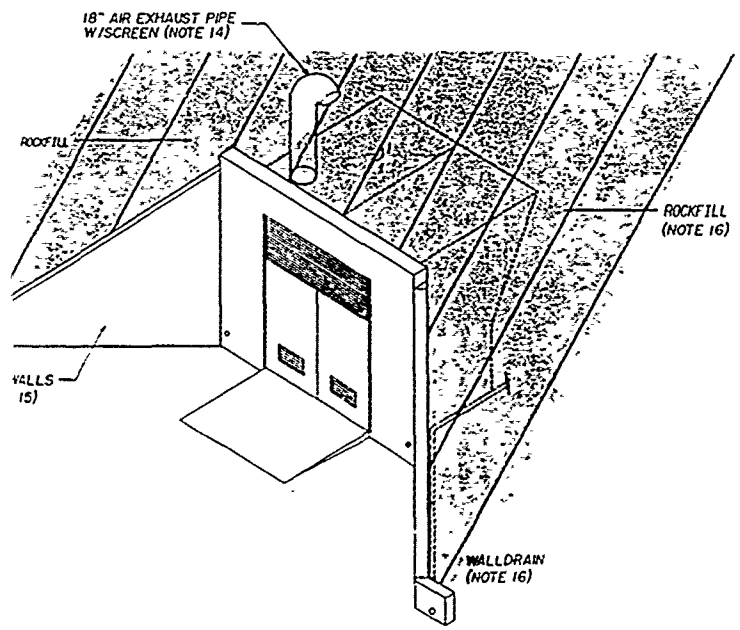


FINISH



DURING ADIT CONSTRUCTION
ISOMETRIC SKETCH

NO SCALE

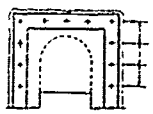


FINISH CONCRETE SKETCH

NO SCALE

ABIQUIU - TUNNEL PORTAL CONCEPT

The portal construction sequence is as follows

1. Clean off face after presplitting operation and develope a level work surface bench
2. Install rock bolts and mesh above and around portal
3. Machine excavate portal approximately 8 ft into rock, installing rock bolts 5 OC EW and mesh as excavation progress
4. Apply 2" layer of shotcrete to rock faces
5. Install rock bolts at 3' 0" O C for RF 6
6. 

ELEVATION AT RF-6
7. Pour footings for rigid frames RF 1 thru 6
8. Install RF6 - connecting RF-6 to adjoining rock bolts and blocking between RF6 and shotcrete faces
9. Install RF-1 thru RF-5 with 2 x 2 x 1/4 ∠ cross bridging between rigid frame girders and 1/2" ϕ cross bracing between rigid frames 2, and 3 and 3, and 4
10. Shotcrete walls and ceiling and rigid frames RF-4 5 and 6 at portal except for wall area 9 ft wide by 10 ft high where tunnel starts
11. Install steel deck on rigid frames RF-1 2 3 and 4 for future concrete slab
12. On the steel deck install plywood panels 4' x 12' in size Panels to be of 2-3/4" exterior grade plywood on 2 x 6 @ 16" OC


Anchor panels to deck as required to remain in place during construction (purpose of temporary panels is to protect steel deck from impact of stones rolling off hill)
13. Tunnel construction to commence next
14. After tunnel is complete - remove temporary plywood panels, form and place concrete floor and pit, walls and roof Install air exhaust
15. Construct wing walls
16. Install wall drains and fill around structure
17. Install louvers and doors lighting and ventilation in portal

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U S ARMY ENGINEER DISTRICT ALBUQUERQUE
CORPS OF ENGINEERS
ALBUQUERQUE NEW MEXICO

DESIGNED BY J.M.C.
DRAWN BY S.J.M.
CHECKED BY R.B.C.

ABIQUIU RESERVOIR

CONTRACT NO DACW47-86-D-0038

ISOMETRIC FOR PORTAL SEQUENCE

TO ACCOMPANY D M #20
TERRA ENGINEERING CONSULTANTS INC
DATE 8/88

FILE NUMBER
RGAB-AA-DM-14
SHEET 14 OF 21

PLATE
14

LEGEND

LEGEND

CH-8 — CORE HOLES (EXISTING)
AB-C-7 — CORE HOLES DRILLED IN 1987
P-9 — EXISTING PIEZOMETERS

Scale 1" = 100'

CONTOUR INTERVAL 2 FEET
NATIONAL GEODETIC VERTICAL DATUM

COMPILED BY PHOTOGRAMMETRIC METHOD
DATE OF PHOTOGRAPHY APRIL 1 1987

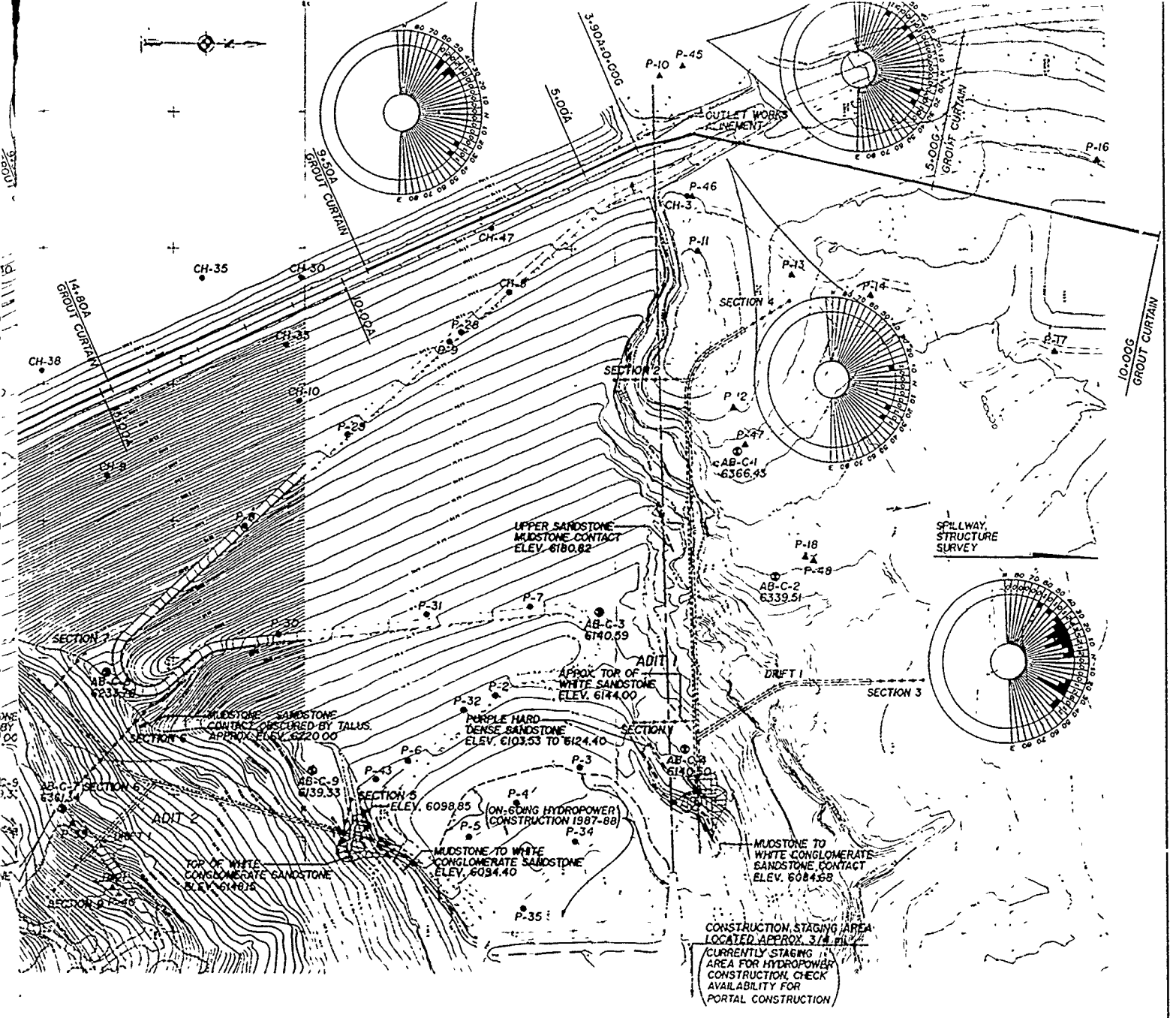
SCALE OF PHOTOGRAPHY 1:7000
CAMERA F.L. 153mm

THIS MAP COMPLIES WITH THE
NATIONAL MAP ACCURACY STANDARDS

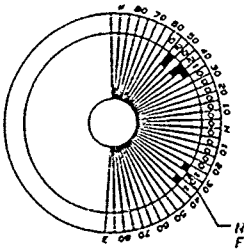
TOPOGRAPHIC MAPPING BY:

KOGGLE & POULS ENGINEERING INC

VALUE ENGINEE



LEGEND



Scale 1 = 100

CONTOUR INTERVAL 2 FEET
NATIONAL GEODETIC VERTICAL DATUM
COMPILED BY PHOTOGRAMMETRIC METHODS
DATE OF PHOTOGRAPHY APRIL 1 1987
SCALE OF PHOTOGRAPHY 1 7000
CAMERA F L 153mm
THIS MAP COMPLIES WITH THE NATIONAL MAP ACCURACY STANDARDS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U S ARMY ENGINEER DISTRICT ALBUQUERQUE
CORPS OF ENGINEERS
ALBUQUERQUE NEW MEXICO

DESIGNED BY: JM
DRAWN BY: S.JM
CHECKED BY: RBC

ABIQUIU RESERVOIR

CONTRACT NO DACW47-86-D-0038

GEOLOGY PLAN

TO ACCOMPANY D M #20

TIERRA ENGINEERING CONSULTANTS INC

DATE

FILE NUMBER

PLATE 20

APPENDIX 11

DRILLING LOGS

DRILLING LOG	DIVISION	INSTALLATION	SHEET / OF 3 SHEETS
	S.W.D.	ALBUQUERQUE DISTRICT	

1. PROJECT	ABIQUIU DAM	10. SIZE AND TYPE OF BIT	N X
2. LOCATION (Coordinates or Station)	SOUTH DRIFT (#2)	11. DATUM FOR ELEVATION SHOWN (TDM or MSL)	6107.75
3. DRILLING AGENCY	ALBUQUERQUE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL	STANWICK
4. HOLE NO. (As shown on drawing title and file number)	0+20	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED N/A / UNDISTURBED N/A
5. NAME OF DRILLER	CONTINENTAL DRILLING	14. TOTAL NUMBER CORE BOXES	N/A
6. DIRECTION OF HOLE	☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER	N/A
7. THICKNESS OF OVERBURDEN	N/A	16. DATE HOLE	STARTED 5 OCT 1989 / COMPLETED 9 OCT 1989
8. DEPTH DRILLED INTO ROCK	±147'	17. ELEVATION TOP OF HOLE	6107.75
9. TOTAL DEPTH OF HOLE	147'	18. TOTAL CORE RECOVERY FOR BORING	N/A %
		19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6107.75	0.0		SANDSTONE, WHITE (MEDIUM TO COARSE GRAINED), RED (FINE TO MEDIUM GRAINED). MODERATELY HARD TO HARD			QUICK DRILLING
	5					
	10					
	15					
	20					
	25					
	30					
	35					
6149	40					
			MUDSTONE, DARK RED, SOFT WITH GREEN SILTSTONE.			SLOW DRILLING, HOLE PLUGGED UP
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT ABIQUIU DAM HOLE NO.

Hole No 0420 SOUTH DRIFT (#2)

DRILLING LOG

DIVISION: S.W.D.

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 3 SHEETS

1 PROJECT: ABIQUIU DAM

2. LOCATION (Coordinates or Station): SOUTH DRIFT (#2)

3. DRILLING AGENCY: ALBUQUERQUE DISTRICT

4. HOLE NO. (As shown on drawing title and file number): 0420

5. NAME OF DRILLER: CONTINENTAL DRILLING

6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN: N/A

8. DEPTH DRILLED INTO ROCK: ±147'

9. TOTAL DEPTH OF HOLE: 147'

10. SIZE AND TYPE OF BIT: N X

11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6107.75

12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED N/A; UNDISTURBED N/A

14. TOTAL NUMBER CORE BOXES: N/A

15. ELEVATION GROUND WATER: N/A

16. DATE HOLE: STARTED 5 OCT 1989; COMPLETED 9 OCT 1989

17. ELEVATION TOP OF HOLE: 6255

18. TOTAL CORE RECOVERY FOR BORING: N/A %

19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6107.75	0.0		SANDSTONE, WHITE (MEDIUM TO COARSE GRAINED), RED (FINE TO MEDIUM GRAINED). MODERATELY HARD TO HARD			QUICK DRILLING
6148	40		MUDSTONE, DARK RED, SOFT WITH GREEN SILTSTONE			SO [illegible] HOLE [illegible]
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT ABIQUIU DAM HOLE NO

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. C1 2C 3 DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIAL (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. C12 S DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
	115					
6225						
	120		SANDSTONE, RED TO BROWN, FINE TO MEDIUM GRAINED, FE O STAINS. CONGLOMERITIC IN AREAS, SMALL AMOUNTS OF MUDSTONE PRESENT			
	125					
	130					
	135					
	140					
	145					
6255						
			TOH			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 626 - 603

PROJECT: ABIQUIU DAM | HOLE NO C12 S DRIFT

Hole No. 0+40 SOUTH DRIFT (A2)

DRILLING LOG

DIVISION: S.W.D

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): SOUTH DRIFT (A2)
3. DRILLING AGENCY: ABUQUERQUE DISTRICT
4. HOLE NO. (As shown on drawing title and file number): 0+40
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: N/A
8. DEPTH DRILLED INTO ROCK: 147 ft
9. TOTAL DEPTH OF HOLE: 147 ft
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TUM or MSL): 6107.60
12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED N/A; UNDISTURBED N/A
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER: N/A
16. DATE HOLE: STARTED 10 OCT 1984; COMPLETED 11 OCT 1984
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6107.60	0.0		SANDSTONE, WHITE (MEDIUM TO COARSE GRAINED), RED (FINE TO MEDIUM GRAINED), MODERATELY HARD TO HARD.			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6150			MUDSTONE, DARK RED, SOFT WITH GREEN SILTSTONE			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT ABIQUIU DAM HOLE NO.

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. C+4.0 S DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	55		MUDSTONE AS ABOVE			
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. C-40-5 DRIFT

PROJECT ABIQUIU DAM | INSTALLATION ALBUQUERQUE DISTRICT | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
	115					
	120					
6230						
	125		SAND STONE: RED TO BROWN, FINE TO MEDIUM GRAINED, CONGLOMERITIC IN AREAS AND SOME MUDSTONE PRESENT			
	130					
	135					
	140					
	145					
6255						
	150		TOH.			

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1960 OF - 628-503

PROJECT ABIQUIU DAM | HOLE NO C-40-5 DRIFT

DRILLING LOG

DIVISION: S.W.D.

INSTALLATION: ALBUQUERQUE DISTRICT

1. PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	SOUTH DRIFT (#2)
3. DRILLING AGENCY	ALBUQUERQUE DISTRICT
4. HOLE NO. (As shown on drawing title and file number)	0+60
5. NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	N/A
8. DEPTH DRILLED INTO ROCK	147'
9. TOTAL DEPTH OF HOLE	147'
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	6108.00
12. MANUFACTURER'S DESIGNATION OF DRILL	STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: N/A; UNDISTURBED: N/A
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	N/A
16. DATE HOLE	STARTED: 12 OCT 1989; COMPLETED: 12 OCT 1989
17. ELEVATION TOP OF HOLE	6245
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108	0 0		SANDSTONE: WHITE (MEDIUM TO COARSE GRAINED), RED (FINE TO MEDIUM GRAINED) MODERATELY HARD TO HARD			
	5					
	10					
	15					
	20					
	75					
	30					
	35					
6148	40		MUDSTONE: DARK RED, SOFT WITH GREEN SILTSTONE			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT: ABIQUIU DAM

HOLE NO.

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 625

PROJECT: ABIQUIU DAM

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET: OF 5 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc if significant) g
	30		MUDSTONE AS ABOVE			
	35					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110 1-1801) GPO 1980 OF-626-603

PROJECT: ABIQUIU DAM

HOLE NO: C-4 SHEET 5

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 6255

PROJECT ABIQUIU DAM

INSTALLATION ALBUQUERQUE DISTRICT

OF 5 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
	115					
	120					
	125					
6235						
	130		SANDSTONE: RED TO BROWN, FINE TO MEDIUM GRAINED, CONGLOMERITIC IN AREAS AND SOME MUDSTONE PRESENT			
	135					
	140					
	145					
6255						
			T.O.H.			
	150					

ENG FORM 1836-A (ER 1110-1-1801) GPO 1985 OF - 628 - 623

PROJECT

HOLE NO

DRILLING LOG

DIVISION: S.W.D

INSTAL.: ALBUQUERQUE, N. MEX.

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): SOUTH DRIFT (H2)
3. DRILLING AGENCY: ALBUQUERQUE DISTRICT
4. HOLE NO. (As shown on drawing title and file number): 0180
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: N/A
8. DEPTH DRILLED INTO ROCK: 147'
9. TOTAL DEPTH OF HOLE: 147'
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6108.00
12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED N/A; UNDISTURBED N/A
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER: N/A
16. DATE HOLE: STARTED 13 OCT 1989; COMPLETED 14 OCT 1989
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108	0.0		SANDSTONE: WHITE TO RED FINE-COARSE GRAINED MODERATELY HARD TO HARD			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6152						
	45		MUDSTONE: DARK RED, SOFT WITH GREEN SILTSTONE			
	50					

ENG FORM 1836 MAR 7[illegible] PREVIOUS EDITIONS [illegible] OBSOLETE

PROJECT: ABIQUIU DAM

HOLE NO.

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1969 O-628 503

PROJECT: ABIQUIU DAM | HOLE NO: [illegible]

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF [illegible] 6255

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
	115					
6227						
	120		SANDSTONE: RED TO BROWN, FINE TO MEDIUM GRAINED, CONGLOMERITIC IN AREAS, MUDSTONE PRESENT			
	125					
	130					
	135					
	140					
	145					
6255						
			T.O.H.			
	150					

ENG FORM 1836-A JUN 67 (FR 1110 1-1901) GPO 1980 O-328-603 | PROJECT: ABIQUIU DAM | HOLE NO [illegible]

Hole No. [illegible]

DRILLING LOG | DIVISION: S.W.D | [illegible] ALBUQUERQUE

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): SOUTH DRIFT (d2)
3. DRILLING AGENCY: ALBUQUERQUE DISTRICT
4. HOLE NO. (As shown on drawing title and file number): [illegible] 1400
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN:
8. DEPTH DRILLED INTO ROCK: 146'
9. TOTAL DEPTH OF HOLE: 146'
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6109.10
12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — | UNDISTURBED —
14. TOTAL NUMBER CORE BOXES —
15. ELEVATION GROUND WATER —
16. DATE HOLE: STARTED 14 OCT 1959 | COMPLETED 16 OCT 1959
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING — %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6109.10	00		SANDSTONE: WHITE TO RED, FINE TO COARSE GRAINED, MODERATELY HARD TO HARD			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6151						
			MUDSTONE: DARK RED, SOFT WITH GREEN SILTSTONE			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: ABIQUIU DAM | HOLE NO

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6252

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc.; if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 6255

PROJECT: ABIQUIU DAM

INSTALLATION: ALBUQUERQUE DISTRICT

OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering etc., if significant) g
	110		MUDSTONE AS ABOVE			
	115					
6230	120					
			SANDSTONE: RED TO BROWN, FINE TO MEDIUM GRAINED, MUDSTONE PRESENT			
	125					
	130					
	135					
	140					
6255	145					
			T.O.H			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1900 OF 620-603

PROJECT: ABIQUIU DAM

HOLE NO

Hole No 1420 SOUTH DRIFT

DRILLING LOG

DIVISION: SWD

INSTALLATION: ABEQ

1 PROJECT: ABIQUIU DAM

2 LOCATION (Coordinates or Station): SOUTH DRIFT (#2)

3 DRILLING AGENCY: ALBUQUERQUE DISTRICT

4 HOLE NO. (As shown on drawing title and file number): 1420

5 NAME OF DRILLER: CONTINENTAL DRILLING

6 DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG FROM VERT.

7 THICKNESS OF OVERBURDEN: —

8 DEPTH DRILLED INTO ROCK: 146'

9 TOTAL DEPTH OF HOLE: 146'

10 SIZE AND TYPE OF BIT: N1

11 DATUM FOR ELEVATION SHOWN (TUM or MSL): 6109.20

12 MANUFACTURER'S DESIGNATION OF DRILL: STANDARD

13 TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — UNDISTURBED —

14 TOTAL NUMBER CORE BOXES: —

15 ELEVATION GROUND WATER: —

16 DATE HOLE: STARTED 18 OCT 1958 COMPLETED 18 OCT 1958

17 ELEVATION TOP OF HOLE: 6125

18 TOTAL CORE RECOVERY FOR BORING: %

19 SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6109.20	0		SANDSTONE, WHITE TO RED, FINE TO COARSE GRAINED, MODERATELY HARD TO HARD			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
6149	40		MUDSTONE, DARK RED, SILT WITH GREEN SILTSTONE			
	45					
	50					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6233 | HOR. N

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | OF 5 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (BR 1110-1-1801) GPO 1980 OF - 628 (03

PROJECT: ABIQUIU DAM | HOLE NO. [illegible]

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6235 | Hole No

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | OF 5 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	110		MUDSTONE AS ABOVE			
	115					
	120		SANDSTONE: RED TO BROWN, FINE TO MEDIUM GRAINED, MUDSTONE PRESENT.			
	125					
	130					
	135					
	140					
6235	145					
			TOH			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1969 OF - 628 - 603

PROJECT ABIQUIU DAM | HOLE NO 17c SIDRIFT

Hole No. 1140 SDRIFT

DRILLING LOG | DIVISION: S.W.D | INSTALLATION: [illegible]

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): SOUTH DRIFT (B 2)
3. DRILLING AGENCY: ALBUQUERQUE DISTRICT
4. HOLE NO. (As shown on drawing title and file number): 1140
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 146'
9. TOTAL DEPTH OF HOLE: 146'
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6108.97
12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — | UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED 19 OCT 1989 | COMPLETED 19 OCT. 1989
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108.97	0.0		SANDSTONE: WHITE TO RED FINE TO COARSE GRAINED, MODERATELY HARD TO HARD			
6151	40					
	45		MUDSTONE: DARK RED, SOFT, GREEN SILTSTONE PRESENT			
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT: Abiquiu Dam | HOLE NO.

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No [illegible]

PROJECT ABIQUIU DAM | INSTALLATION ALBUQUERQUE DISTRICT | OF 5 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No 1140 S DRIFT

PROJECT ABIQUIU DAM | INSTALLATION ALBUQUERQUE DISTRICT | SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE.			
	115					
6227						
	120		SANDSTONE: RED TO BROWN, FINE TO MEDIUM GRAINED, 30% MUDSTONE			
	125					
	130					
	135					
	140					
	145					
6255						
			T.O.H.			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF-626-603

PROJECT ABIQUIU DAM | HOLE NO 1140 S DRIFT

Hole No 1160 S DRIFT

DRILLING LOG

DIVISION: S.W.D

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): SOUTH DRIFT (H2)
3. DRILLING AGENCY: ALBUQUERQUE DISTRICT
4. HOLE NO. (As shown on drawing title and file number): 1160
5. NAME OF DRILLER: CONTINENTAL
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 147'
9. TOTAL DEPTH OF HOLE: 147'
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TDM or MSL): 6108.59
12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED 19 OCT 1989; COMPLETED 20 OCT 1989
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108.59	0		SANDSTONE: WHITE TO RED, FINE TO COARSE GRAINED.			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
6149	40		MUDSTONE: DARK RED, SOFT, GREEN SILTSTONE PRESENT			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT: ABIQUIU DAM

HOLE NO 1160

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 116-S DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. of undisturbed) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 1100 S DRIFT

PROJECT ABIQUIU DAM | INSTALLATION ALBUQUERQUE DISTRICT | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	110		MUDSTONE AS ABOVE			
	115					
6227						
	120		SANDSTONE: RED TO BROWN, FINE TO MEDIUM GRAINED, 25 30% MUDSTONE			
	125					
	130					
	135					
	140					
	145					
6255						
			TD H			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) 90 1980 OF - 623 703

PROJECT ABIQUIU DAM | HOLE NO 1100 S DRIFT

Hole No 2+50 S ADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET / OF / SHEETS
	S.W.D	ALBUQUERQUE DISTRICT	

1 PROJECT: ABIQUIU DAM
2 LOCATION (Coordinates or Station): SOUTH ADIT (A2)
3 DRILLING AGENCY: ALBUQUERQUE DISTRICT
4 HOLE NO. (As shown on drawing title and file number): 2+50
5 NAME OF DRILLER: CONTINENTAL DRILLING
6 DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7 THICKNESS OF OVERBURDEN: —
8 DEPTH DRILLED INTO ROCK: 55'
9. TOTAL DEPTH OF HOLE: 55'

10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TDM or MSL): 6105.47
12 MANUFACTURER'S DESIGNATION OF DRILL: STANIVICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED NOV 6 1989; COMPLETED NOV 6, 1989
17. ELEVATION TOP OF HOLE: 6160
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6105.47	0.0		SANDSTONE: WHITE AND RED, FINE GRAINED TO MEDIUM			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
	45					
6152						
	50		MUDSTONE: RED AND SOFT, GREEN SILTSTONE PRESENT T.O.H. = 55'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT: ABIQUIU DAM

HOLE NO

Hole No 2+90 S ADIT

DRILLING LOG	DIVISION S.W.D.	INSTALLATION ALBUQUERQUE DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	SOUTH ADIT (#2)
3 DRILLING AGENCY	ALBUQUERQUE DISTRICT
4. HOLE NO. (As shown on drawing title and file number)	2+90
5 NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	—
8 DEPTH DRILLED INTO ROCK	55'
9 TOTAL DEPTH OF HOLE	55'
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TUM or MSL)	6105.49
12. MANUFACTURER'S DESIGNATION OF DRILL	STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — / UNDISTURBED —
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 7 NOV. 1989 / COMPLETED 8 NOV. 1989
17. ELEVATION TOP OF HOLE	6106
18. TOTAL CORE RECOVERY FOR BORING	— %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6105.49	0.		SANDSTONE: WHITE AND RED, FINE GRAINED TO MEDIUM			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6151	45					
			MUDSTONE: RED AND SOFT, GREEN SILTSTONE PRESENT			
	50		T.D.H. = 55'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT ABIQUIU DAM HOLE NO

Hole No 3+30 S.ADIT

DRILLING LOG

DIVISION: S.W.D

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): SOUTH ADIT (#2)
3. DRILLING AGENCY: ALBUQUERQUE DISTRICT
4. HOLE NO. (As shown on drawing title and file number): 3+30
5. NAME OF DRILLER: CONTINENTAL
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 119'
9. TOTAL DEPTH OF HOLE: 119'
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6106.22
12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED 9 NOV. 1989; COMPLETED 9 NOV. 1989
17. ELEVATION TOP OF HOLE: 6225
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6106.22	0		SAND STONE: WHITE AND RED, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6148						
	45		MUDSTONE: RED AND SOFT, GREEN SILTSTONE PRESENT			
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT: Abiquiu Dam

HOLE NO

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6225 | Hole No. 3136 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6225 | Hole No. 5130 S, ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
6222	115					
			SAND STONE; BROWN, MEDIUM GRAINED, SMALL AMOUNT OF MUDSTONE PRESENT			
6225						
T.O.H	120					

Hole No. 3150 S ADIT

DRILLING LOG	DIVISION S.W.D.	INSTALLATION ALBUQUERQUE DISTRICT	SHEET 1 OF 3 SHEETS

1 PROJECT: ABIQUIU DAM		10. SIZE AND TYPE OF BIT: NX	
2. LOCATION (Coordinates or Station): SOUTH ADIT (#2)		11. DATUM FOR ELEVATION SHOWN (TUM or MSL): 6106.16	
3 DRILLING AGENCY: ALBUQUERQUE DISTRICT		12 MANUFACTURER'S DESIGNATION OF DRILL: STANWICK	
4. HOLE NO. (As shown on drawing title and file number): 3150		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —	UNDISTURBED —
5. NAME OF DRILLER: CONTINENTAL DRILLING		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER —	
7. THICKNESS OF OVERBURDEN —		16. DATE HOLE: STARTED 9 NOV. 1989	COMPLETED 10 NOV. 1989
8. DEPTH DRILLED INTO ROCK 119'		17. ELEVATION TOP OF HOLE 6225	
9. TOTAL DEPTH OF HOLE 119'		18. TOTAL CORE RECOVERY FOR BORING — %	
		19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6106.16	0		SANDSTONE: WHITE AND RED, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6149			MUD STONE: RED TO BROWN, SOFT. GREEN SILT STONE PRESENT			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT ABIQUIU DAM HOLE NO

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 6225	Hole No. 3150 S ADIT
PROJECT ABIQUIU DAM	INSTALLATION ALBUQUERQUE DISTRICT	SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6225 | Hole No. 3150 S ADIT

PROJECT ABIQUIU DAM | INSTALLATION ALBUQUERQUE DISTRICT | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE.			
	115					
6224						
6225			SANDSTONE: RED TO BROWN.			
T.D.H	120		60% SANDSTONE, 40% MUDSTONE.			

Hole No. 4130 ; ADIT

DRILLING LOG

DIVISION: S.W.D.

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): SOUTH ADIT (#2)
3. DRILLING AGENCY: ALB. DIST.
4. HOLE NO. (As shown on drawing title and file number): 4130
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 118'
9. TOTAL DEPTH OF HOLE: 118'
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6107.0
12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED 24 OCT, 1989; COMPLETED 25 OCT, 1989
17. ELEVATION TOP OF HOLE: 6225
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6107.0	0		SANDSTONE: RED AND WHITE, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6149			MUDSTONE: DARK BROWN TO RED, SANDY IN AREAS.			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: ABIQUIU DAM

HOLE NO. 4130

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: 6225

Hole No. 4+30 ; A^ T

PROJECT: ABIQUIU DAM

INSTALLATION: ALB DIST

SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 628 - 603

PROJECT: ABIQUIU DAM

HOLE NO 4+30 ; A^ T

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6225 | Hole No. 4+30 S. ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110					@ 6218 lost H2O return. no sample available after that no recovery - must have hit void.
	115					
6225						
			∎ T.O.H			
	120					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 628 - 603

PROJECT: ABIQUIU DAM | HOLE NO 4+30 S ADIT

Hole No. 4170 S ADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 3 SHEETS
	SW.D.	ALBUQUERQUE DISTRICT	

1 PROJECT	Abiquiu Dam	10. SIZE AND TYPE OF BIT	N/X
2 LOCATION (Coordinates or Station)	South Adit (#2)	11. DATUM FOR ELEVATION SHOWN (TUM or MSL)	6109.1
3 DRILLING AGENCY	Albuquerque District	12. MANUFACTURER'S DESIGNATION OF DRILL	CP69
4 HOLE NO. (As shown on drawing title and file number)	4170	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: -- UNDISTURBED: —
5 NAME OF DRILLER	Continental Drilling	14. TOTAL NUMBER CORE BOXES	—
6. DIRECTION OF HOLE	☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER	—
7 THICKNESS OF OVERBURDEN	—	16 DATE HOLE	STARTED: 25 NOV, 1959 COMPLETED: 27 NOV, 1959
8. DEPTH DRILLED INTO ROCK	146'	17. ELEVATION TOP OF HOLE	6255
9. TOTAL DEPTH OF HOLE	146'	18. TOTAL CORE RECOVERY FOR BORING	-- %
		19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6109.1	0		SANDSTONE: WHITE AND RED, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6150			MUDSTONE: RED TO BROWN, SOFT, GREEN SILTSTONE PRESENT.			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT Abiquiu Dam HOLE NO 4170

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 7170 - 1101

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1969 O- 626-603

PROJECT ABIQUIU DAM

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE: 6255 | **Hole No.** 4170 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALBUQUERQUE DISTRICT | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
	115					
	120		SANDSTONE: BROWN, MEDIUM GRAINED, 30% MUDSTONE			
	125					
	130					
	135					@ 6246 erratic drilling [illegible] rotation [illegible] 3 feet
	140					
6255	145					
			TOH			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF 620-603 | PROJECT: ABIQUIU DAM | HOLE NO: 4170 S ADIT

Hole No. 5710 S ADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET
	S.W.D	ALBUQUERQUE DISTRICT	1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): SOUTH ADIT (#2)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6160
3. DRILLING AGENCY: ALB. DIST.	12. MANUFACTURER'S DESIGNATION OF DRILL: CP65
4. HOLE NO. (As shown on drawing title and file number): 5710	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — UNDISTURBED —
5. NAME OF DRILLER: CONTINENTAL DRILLING	14. TOTAL NUMBER CORE BOXES —
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER —
7. THICKNESS OF OVERBURDEN —	16. DATE HOLE: STARTED 1 DEC, 1989 COMPLETED 2 DEC, 1989
8. DEPTH DRILLED INTO ROCK 147'	17. ELEVATION TOP OF HOLE 6255'
9. TOTAL DEPTH OF HOLE 147'	18. TOTAL CORE RECOVERY FOR BORING — %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6160	0.0		SANDSTONE: WHITE AND RED, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
	45		MUDSTONE, RED TO BROWN, SOFT, GREEN SILTSTONE PRESENT			
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT ABIQUIU DAM HOLE NO

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 510 S AUG 1

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1968 OF - 628-603

PROJECT: ABIQUIU ... | HOLE NO.

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 5710 - [illegible]

PROJECT ABIQUIU DAM | INSTALLATION ALB DIST. | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
	115					
6227						
	120		SANDSTONE BROWN, MEDIUM GRAINED ~25% MUDSTONE			
	125					
	130					
	135					
	140					
	145					
6255			T.O.H			

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 626-603

PROJECT ABIQUIU DAM

Hole No. 5120 H11 S ADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET
	SWD	ALBUQUERQUE DISTRICT	1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM	10. SIZE AND TYPE OF BIT: NX
2. LOCATION (Coordinates or Station): SOUTH ADIT (HZ)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6108.1
3. DRILLING AGENCY: ALB. DIST.	12. MANUFACTURER'S DESIGNATION OF DRILL: CP6S
4. HOLE NO. (As shown on drawing title and file number): 5120 H11	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED – ; UNDISTURBED –
5. NAME OF DRILLER: CONTINENTAL DRILLING	14. TOTAL NUMBER CORE BOXES: —
6. DIRECTION OF HOLE: ☐ VERTICAL ☑ INCLINED 8° DEG. FROM VERT.	15. ELEVATION GROUND WATER: —
7. THICKNESS OF OVERBURDEN: —	16. DATE HOLE: STARTED 14 OCT 1989; COMPLETED 15 OCT 1989
8. DEPTH DRILLED INTO ROCK: 149'	17. ELEVATION TOP OF HOLE: 6255
9. TOTAL DEPTH OF HOLE: 149'	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108±	0		SANDSTONE · WHITE TO RED, FINE TO MEDIUM GRAINED			NOTE: ELEVATIONS CORRECTED FOR 8° ANGLE
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6151						
	45		MUDSTONE: RED TO DARK BROWN, SOFT, SANDY IN AREAS			
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT: ABIQUIU DAM

HOLE NO: 5120 H11

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 5720 Hill S Abut

PROJECT: ABIQUIU DAM | INSTALLATION: ALB. DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 5720 #11 S AD.7

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
6225	115					
			SANDSTONE: FINE GRAINED, DARK BROWN TO RED, 30% MUDSTONE.			
	120					
	125					
	130					
	135					
	140					
	145					
6255						
			T.O.H.			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 626-603

PROJECT: ABIQUIU DAM | HOLE NO 5720 #11 AD.

Hole No. 5720 #12.

DRILLING LOG

DIVISION: SWD

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): SOUTH ADIT (N2)
3. DRILLING AGENCY: ALB. DIST
4. HOLE NO. (As shown on drawing title and file number): 5720 #12
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☐ VERTICAL ☒ INCLINED 18° DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 124'
9. TOTAL DEPTH OF HOLE: 124'
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TUM or MSL.): 6108.
12. MANUFACTURER'S DESIGNATION OF DRILL: CP 65
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED 16 NOV, 1989 COMPLETED 17 NOV, 1989
17. ELEVATION TOP OF HOLE: 6228
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108	0		SANDSTONE: WHITE AND RED, FINE TO COARSE GRAINED			
	5					
	10					
	15					
	20					NOTE: ELEVATIONS WERE CALCULATED USING ANGLE
	25					
	30					
	35					
6148	40		MUDSTONE: DARK BROWN TO RED, SOFT, SANDY IN AREAS,			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT ABIQUIU DAM HOLE NO

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6272 | Hole No. 5726 #12

PROJECT ABIQUIU DAM | INSTALLATION AZB DIST. | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6222 | Hole No. 5720 #12

PROJECT: ABIQUIU DAM | INSTALLATION: ALB. DIST. | SHEET 5 OF 5 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
6221						
6222			SANDSTONE: WHITE, FINE GRAINED, 30% MUDSTONE			
T.O.H	115					

Hole No. 57 20 #19 S ADIT

DRILLING LOG

DIVISION: S.W.D.

INSTALLATION: ALBUQUERQUE DIST

SHEET 1

1. PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	SOUTH ADIT (#2)
3. DRILLING AGENCY	ALB DIST
4. HOLE NO. (As shown on drawing title and file number)	5720 #19
5. NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	☐ VERTICAL ☑ INCLINED 78 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	—
8. DEPTH DRILLED INTO ROCK	57±
9. TOTAL DEPTH OF HOLE	57±
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	6102.0
12. MANUFACTURER'S DESIGNATION OF DRILL	CP 6
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — UNDISTURBED —
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 28 OCT, 1987 COMPLETED 30 OCT, 1987
17. ELEVATION TOP OF HOLE	6090
18. TOTAL CORE RECOVERY FOR BORING	— %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6102.0	0		SANDSTONE: COARSE GRAINED, WHITE, CONGLOMERITIC			
6096	5					
			MUDSTONE: RED TO DARK BROWN, SOFT, WITH GREEN MUDSTONE PRESENT			
6090	10					
			B.O.H			NOTE Location sketch form file
	15					
	20					
	25					
	30					
	55					
	40					
	45					
	50					

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PROJECT: ABIQUIU Dam

HOLE NO.

Hole No 5130 S ADIT

DRILLING LOG	DIVISION SWD	INSTALLATION ALBUQUERQUE DIST	SHEET 1

1 PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	SOUTH ADIT (#2)
3. DRILLING AGENCY	ALB. DIST.
4. HOLE NO. (As shown on drawing title and file number)	5730
5. NAME OF DRILLER	CONTINENTAL DRILLING
6 DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	—
8. DEPTH DRILLED INTO ROCK	147'
9. TOTAL DEPTH OF HOLE	147'
10. SIZE AND TYPE OF BIT	AX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	6108
12 MANUFACTURER'S DESIGNATION OF DRILL	CP65
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — / UNDISTURBED —
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 21 NOV 1959 / COMPLETED 22 NOV 1959
17. ELEVATION TOP OF HOLE	6105
18. TOTAL CORE RECOVERY FOR BORING	— %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108	0.0		SANDSTONE: WHITE AND RED, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6150						
			MUDSTONE: RED TO BROWN, SOFT			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT ABIQUIU DAM

HOLE NO

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6755 | Hole No.

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DISTRICT | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole

PROJECT: ABIQUIU DAM | INSTALLATION: AZB DIST | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE As ABOVE			
6221						
			SANDSTONE: FINE GRAINED, 35% MUDSTONE.			
	115					
	120					
	125					
	130					Coring rolled sporadically and would pick up with little resistance but rotation was maintained for 2-3 feet.
	135					
	140					
	145					
6255						
			T.D H			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 626 - 603

PROJECT: ABIQUIU Dam | HOLE NO. [illegible]

Hole No. 5850 SADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET
	S.W.D.	ALBUQUERQUE DISTRICT	1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM	10. SIZE AND TYPE OF BIT: NX
2. LOCATION (Coordinates or Station): SOUTH ADIT (A2)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6108.87
3. DRILLING AGENCY: ALB DIST.	12. MANUFACTURER'S DESIGNATION OF DRILL: CP 6S
4. HOLE NO. (As shown on drawing title and file number): 5750	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — UNDISTURBED —
5. NAME OF DRILLER: CONTINENTAL DRILLING	14. TOTAL NUMBER CORE BOXES: —
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: —
7. THICKNESS OF OVERBURDEN: —	15. DATE HOLE: STARTED 11 NOV. 1989 COMPLETED 14 NOV. 1989
8. DEPTH DRILLED INTO ROCK: 146'	17. ELEVATION TOP OF HOLE: 6255
9. TOTAL DEPTH OF HOLE: 146'	18. TOTAL CORE RECOVERY FOR BORING: — %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108.87	0		SANDSTONE: WHITE TO RED, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6151			MUDSTONE: RED TO DARK BROWN, SOFT, GRITTY IN AREAS (SAND)			
	45					
	50					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 5750 SADT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc.; if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. [illegible]

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	110		MUDSTONE AS ABOVE			
6225	115					
			SANDSTONE: FINE GRAINED, BROWN TO RED, 30% MUDSTONE			
	120					
	125					
	130					
	135					
	140					
6255	145					
			TO 11.			
	150					

ENG FORM [illegible] (ER 1110-1-1801) GPO 1980 OF - 620 - 603 | PROJECT [illegible] | HOLE [illegible]

Hole No. 5170 SADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET
	S.W.D	ALBUQUERQUE DISTRICT	1 OF 3 SHEETS

1. PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	SOUTH ADIT (#2)
3. DRILLING AGENCY	ALB. DIST.
4. HOLE NO. (As shown on drawing title and file number)	5170
5. NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	—
8. DEPTH DRILLED INTO ROCK	147'
9. TOTAL DEPTH OF HOLE	147'
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	6108
12. MANUFACTURER'S DESIGNATION OF DRILL	CP 65
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — / UNDISTURBED —
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 7 NOV, 1989 / COMPLETED 8 NOV, 1989
17. ELEVATION TOP OF HOLE	6105
18. TOTAL CORE RECOVERY FOR BORING	— %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108	0		SANDSTONE: WHITE AND RED, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	70					
	25					
	30					
	35					
	40					
6150						
	45		MUDSTONE DARK BROWN TO RED, SOFT, SANDY IN AREAS, GREEN SILTSTONE PRESENT			
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT | HOLE NO

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6755 | Hole No. S-70 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST | SHEET 2 OF — SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 5770 S ADIT

PROJECT ABIQUIU DAM | INSTALLATION ALB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc.; if significant) g
	110		MUDSTONE AS ABOVE			
	115					
	120					
6229						
			SANDSTONE: FINE GRAINED, BROWN TO RED, 30% MUDSTONE			
	125					
	130					
	135					
	140					
	145					
6225						
			T.D.H.			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF 620-603

PROJECT ABIQUIU DAM | HOLE NO 5770 S ADIT

Hole No. 5140 S ADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET / OF 3 SHEETS
	S.W.D	ALBUQUERQUE DISTRICT	

1. PROJECT: AZTQUU DAM		10. SIZE AND TYPE OF BIT: NX	
2. LOCATION (Coordinates or Station): SOUTH ADIT (d2)		11. DATUM FOR ELEVATION SHOWN (TUM or MSL): 6108	
3. DRILLING AGENCY: ALB. DIST		12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK	
4. HOLE NO. (As shown on drawing title and file number): 5140		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED / UNDISTURBED
5. NAME OF DRILLER: CONTINENTAL DRILLING		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE: STARTED 8 NOV 1989	COMPLETED 9 NOV, 1989
7. THICKNESS OF OVERBURDEN: —		17. ELEVATION TOP OF HOLE: 6105	
8. DEPTH DRILLED INTO ROCK: 147'		18. TOTAL CORE RECOVERY FOR BORING: — %	
9. TOTAL DEPTH OF HOLE: 147'		19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108	0		SAND STONE: RED AND WHITE, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	70					
	75					
	30					
	35					
	40					
6151			MUDSTONE DARK BROWN TO RED, SOFT, SANDY IN AREAS			
	45					
	50					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6755 | Hole No. 5190 S. ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. S190 S ABUT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 5 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
	115					
6226						
	120		SANDSTONE: BROWN - RED, FINE GRAINED, 30% MUD-STONE			
	125					
	130					
	135					
	140					
	145					
6255						
			T.D H			
	150					
	155					

ENG FORM

Hole No. G+10 S ADIT

DRILLING LOG	DIVISION: S W D	INSTALLATION: ALBUQUERQUE DISTRICT	SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM	10. SIZE AND TYPE OF BIT: NX
2. LOCATION (Coordinates or Station): SOUTH ADIT (#2)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6108 ±1
3. DRILLING AGENCY: ALB. DIST.	12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK
4. HOLE NO. (As shown on drawing title and file number): G+10	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — UNDISTURBED —
5. NAME OF DRILLER: CONTINENTAL DRILLING	14. TOTAL NUMBER CORE BOXES: —
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: —
7. THICKNESS OF OVERBURDEN: —	16. DATE HOLE: STARTED 10 NOV, 1959 COMPLETED 10 NOV, 1959
8. DEPTH DRILLED INTO ROCK: 146 ±	17. ELEVATION TOP OF HOLE: 6255
9. TOTAL DEPTH OF HOLE: 146 ±	18. TOTAL CORE RECOVERY FOR BORING: — %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108.81	0		SANDSTONE: RED AND WHITE, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
6150	40					
	45		MUD STONE: DARK BROWN TO RED, SOFT, SANDY IN PLACES, GREEN SILTSTONE PRESENT			
	50					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE: 6255 | Hole No. 6410 S A01T

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6755 | Hole No. 6+10 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: AZB. DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
6725	115					
			SANDSTONE: BROWN TO RED, FINE GRAINED, 30% MUD-STONE			
	120					
	125					
	130					
	135					
	140					
6755	145					
			T.O.H			
	150					

ENG FORM 1836-A (REV. 1110 1 1801) PROJECT

Hole No. 6130 S ADIT

DRILLING LOG	DIVISION S.W.D	INSTALLATION ALBUQUERQUE DISTRICT	SHEET 1 OF 3 SHEETS

1. PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	SOUTH ADIT (HZ)
3. DRILLING AGENCY	ALB. DIST.
4. HOLE NO. (As shown on drawing title and file number)	6130
5. NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	—
8. DEPTH DRILLED INTO ROCK	146'
9. TOTAL DEPTH OF HOLE	146'
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	6108.9'
12. MANUFACTURER'S DESIGNATION OF DRILL	STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — UNDISTURBED —
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 11 NOV 1989 COMPLETED 14 NOV 1989
17. ELEVATION TOP OF HOLE	6235'
18. TOTAL CORE RECOVERY FOR BORING	— %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6108.91	0.0		SANDSTONE: WHITE AND RED, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6151						
			MUDSTONE: DARK BROWN, RED, SOFT, SANDY IN AREAS			
	45					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 61 Sc 5 ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: AEB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	CORE SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6755 | Hole No. 6130 S 1801 T

PROJECT ABIQUIU DAM | INSTALLATION ALB DIST | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
	115					
6226						
			SANDSTONE: BROWN TO RED, WHITE, FINE GRAINED, 40% MUDSTONE			
	120					
	125					
	130					
	135					
	140					
	145					
6255						
			T.O.H.			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 628 - 603

PROJECT ABIQUIU DAM | HOLE NO 6130 S 1801 T

Hole No. 6152 SHT

DRILLING LOG	DIVISION S.W.D	INSTALLATION ALBUQUERQUE DISTRICT	SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM	10. SIZE AND TYPE OF BIT: NX
2. LOCATION (Coordinates or Station): SOUTH ADIT NO.	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6109.11
3. DRILLING AGENCY: ALB. DIST	12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK
4. HOLE NO. (As shown on drawing title and file number): 6152	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED –; UNDISTURBED —
5. NAME OF DRILLER: CONTINENTAL DRILLING	14. TOTAL NUMBER CORE BOXES: —
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: ----
7. THICKNESS OF OVERBURDEN: —	16. DATE HOLE: STARTED 14 NOV, 1987; COMPLETED 15 NOV, 1989
8. DEPTH DRILLED INTO ROCK: 146'	17. ELEVATION TOP OF HOLE: 6155
9. TOTAL DEPTH OF HOLE: 146'	18. TOTAL CORE RECOVERY FOR BORING: — %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6109.11	0		SAND STONE: WHITE AND RED, FINE TO MEDIUM GRAINED,			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
	45		MUDSTONE: DARK BROWN TO RED, SOFT, SANDY IN AREAS			
	50					

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PROJECT: ABIQUIU DAM

HOLE NO: 6152

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 6+52 SADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 2 OF 5 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 6-SD-S-MAIE

PROJECT: ADIRONDACK DAM | INSTALLATION: ALB DIST | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	110		MUDSTONE AS ABOVE			
6224						
	115		SANDSTONE: BROWN, RED AND WHITE, FINE GRAINED, 30% MUDSTONE			
	120					
	125					
	130					
	135					
	140					
	145					
6255						
			T.D. 41			
	150					
	155					
	160					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1966 O-620 693

PROJECT ADIRONDACK DAM | HOLE NO 6-SD-S-MAIE

Hole No. 6170 S ADIT

DRILLING LOG

DIVISION: S.W.D.

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): SOUTH ADIT (#2)
3. DRILLING AGENCY: ALB. DIST.
4. HOLE NO. (As shown on drawing title and file number): 6170
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 146 ±
9. TOTAL DEPTH OF HOLE: 146 ±
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6109.0
12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED 14 NOV 1959; COMPLETED 15 NOV 1959
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6109	0		SANDSTONE: WHITE AND RED, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
6146						
	140		MUDSTONE: DARK BROWN TO RED, SOFT, SANDY IN AREAS; GREEN SILTSTONE PRESENT IN SMALL AMOUNTS			
	145					
	150					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT: ABIQUIU DAM

HOLE NO: A1

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 6-170 S ADIT

PROJECT: ADIRONDACK DAM | INSTALLATION: ALB DIST. | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole N 6170 S ABIT

PROJECT: ABIQUIU DAM | INSTALLATION: AEB DIST. | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO f	(Drilling weather)	REMARKS (water loss depth of etc. if significant) g
	110		MUDSTONE AS ABOVE				
6224	115		SANDSTONE: WHITE RED AND BROWN, FINE GRAINED, 30% MUDSTONE				
	120						
	125						
	130						
	135						
	140						
6235	145		T.D. H				
	150						

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF 628-603 | PROJECT ABIQUIU DAM | HOLE NO 6170 S ABIT

Hole No. 6190 - ADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET
	SWD	ALBUQUERQUE DISTRICT	1 OF 3 SHEETS

1. PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	SOUTH ADIT (#2)
3. DRILLING AGENCY	ALB. DIST.
4. HOLE NO. (As shown on drawing title and file number)	6190
5. NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	—
8. DEPTH DRILLED INTO ROCK	145'
9. TOTAL DEPTH OF HOLE	145'
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	6110.10
12. MANUFACTURER'S DESIGNATION OF DRILL	STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — / UNDISTURBED —
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 15 NOV 1989 / COMPLETED 16 NOV, 1989
17. ELEVATION TOP OF HOLE	6255
18. TOTAL CORE RECOVERY FOR BORING	— %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6110.10	0		SANDSTONE: WHITE AND RED, FINE TO MEDIUM GRAINED.			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
6051	40					
	45		MUDSTONE: DARK BROWN TO RED, SOFT, SANDY IN AREAS, SMALL AMOUNT OF GREEN SILTSTONE PRESENT			
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT Abiquiu Dam

HOLE NO 6190

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6755 | Hole No. 6+90 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1966 OF - 626-603

PROJECT: ABIQUIU DAM | HOLE NO: 6+90 S ADIT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6755 | Hole No. 6190 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST | SHEET 5 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
6225	115		SANDSTONE: BROWN, RED, WHITE, FINE GRAINED, 30% MUDSTONE			
	120					
	125					
	130					
	135					
	140					
6205	145		T.O.H.			
	150					
	155					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 620 - 603

PROJECT: ABIQUIU DAM. | HOLE NO 6190 S ADIT

Hole No 7+10 SOUTH ADIT

DRILLING LOG

DIVISION: SWD

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 3 SHEETS

1 PROJECT	ABIQUIU DAM
2 LOCATION (Coordinates or Station)	SOUTH ADIT (#2)
3 DRILLING AGENCY	ALB. DIST.
4 HOLE NO. (As shown on drawing title and title number)	7+10
5 NAME OF DRILLER	CONTINENTAL DRILLING
6 DIRECTION OF HOLE	☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7 THICKNESS OF OVERBURDEN	—
8 DEPTH DRILLED INTO ROCK	145'
9 TOTAL DEPTH OF HOLE	145'
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TUM or MSL)	6110 MSL
12 MANUFACTURER'S DESIGNATION OF DRILL	CP65
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — UNDISTURBED —
14 TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 16 NOV, 1989 COMPLETED 17 NOV 1989
17. ELEVATION TOP OF HOLE	6235
18. TOTAL CORE RECOVERY FOR BORING	— %
19 SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6110 +/-	0		SANDSTONE: WHITE AND RED, FINE TO COARSE GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6153						
	45		MUDSTONE: DARK BROWN TO RED, SOFT, SANDY IN AREAS			
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT ABIQUIU DAM

HOLE NO 7+10

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 7110 S ADT

PROJECT: ABIQUIU DAM | INSTALLATION: AZ 8 DIST. | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling rate, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) PROJECT ABIQUIU DAM HOLE NO 7110 S ADT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6755 | Hole No T-10 S ADIT

PROJECT ARIQUIP DAM | INSTALLATION ALB DIST. | SHEET 3 OF 5 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling rate, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
	115					
6228						
	120		SANDSTONE: WHITE RED AND BROWN, FINE GRAINED, 30% MUDSTONE.			
	125					
	130					
	135					
	140					
6215						
	145		T.D. H			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) | PROJECT ARIQUIP DAM | HOLE NO T-10 S ADIT

Hole No. 7+30 T

DRILLING LOG	DIVISION	INSTALLATION	SHEET
	S.W.D.	ALBUQUERQUE DISTRICT	1 OF 3 SHEETS

1. PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	SOUTH ADIT (#2)
3. DRILLING AGENCY	ALB. DIST.
4. HOLE NO. (As shown on drawing title and file number)	7+30
5. NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	—
8. DEPTH DRILLED INTO ROCK	145'
9. TOTAL DEPTH OF HOLE	145'
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	6110.53
12. MANUFACTURER'S DESIGNATION OF DRILL	STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — / UNDISTURBED —
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 16 NOV, 1989 / COMPLETED 17, NOV, 1989
17. ELEVATION TOP OF HOLE	6255
18. TOTAL CORE RECOVERY FOR BORING	— %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6110.53	0		SANDSTONE: WHITE AND RED, FINE TO MEDIUM GRAINED.			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
6150						
	40		MUDSTONE DARK BROWN TO RED, SOFT, SANDY IN AREAS			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT ABIQUIU DAM HOLE NO. 7+30 ADIT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 7+30 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 628 - 603

PROJECT: ABIQUIU DAM | HOLE NO 7+30 S ADIT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE: 6255 | Hole No. 7+30 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6225	110		MUDSTONE AS ABOVE			
	115		SANDSTONE: BROWN, RED AND WHITE, FINE GRAINED, 30% MUDSTONE			
	120					
	125					
	130					
	135					
	140					
	145		T O H			
	150					

Hole No 7+50 S ADIT

DRILLING LOG

DIVISION: S.W.D.

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 3 SHEETS

1 PROJECT: ABIQUIU DAM

2. LOCATION (Coordinates or Station): SOUTH ADIT (72)

3 DRILLING AGENCY: ALB. DIST.

4 HOLE NO. (As shown on drawing title and file number): 7+50

5. NAME OF DRILLER: CONTINENTAL DRILLING

6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN: —

8. DEPTH DRILLED INTO ROCK: 144'

9 TOTAL DEPTH OF HOLE: 144'

10. SIZE AND TYPE OF BIT: N/X

11. DATUM FOR ELEVATION SHOWN (TUM or MSL): 6111.13

12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —

14. TOTAL NUMBER CORE BOXES: —

15. ELEVATION GROUND WATER: —

16. DATE HOLE: STARTED 17 NOV 1959; COMPLETED 18 NOV 1959

17. ELEVATION TOP OF HOLE: 6235

18. TOTAL CORE RECOVERY FOR BORING: —— %

19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6111.13	0		SANDSTONE: WHITE AND RED, FINE TO COARSE GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
6100	40		MUDSTONE: DARK BROWN TO RED, SOFT, SANDY IN AREAS			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT: ABIQUIU DAM

HOLE NO 7+50 S. ADIT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No 7+50 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ACB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	(Drilling weather)	REMARKS (water loss, depth of ... if significant) g
	50		MUDSTONE AS ABOVE				
	55						
	60						
	65						
	70						
	75						
	80						
	85						
	90						
	95						
	100						
	105						
	110						

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No 7+30 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6223	110		MUDSTONE AS ABOVE			
	115		SANDSTONE: WHITE, RED AND BROWN, FINE GRAINED, 30% MUDSTONE.			
	120					
	125					
	130					
	135					
	140					
6213						
	145		T. O. H.			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1990 OF - 620 - 603

PROJECT: ABIQUIU DAM | HOLE NO 7+30 S ADIT

Hole No 7+70 S ADIT

DRILLING LOG	DIVISION S.W.D.	INSTALLATION ALBUQUERQUE DISTRICT	SHEET 1 OF 3 SHEETS

1 PROJECT: ABIQUIU DAM

2. LOCATION (Coordinates or Station): SOUTH ADIT (AZ)

3 DRILLING AGENCY: ALB. DIST.

4 HOLE NO. (As shown on drawing title and file number): 7+70

5 NAME OF DRILLER: CONTINENTAL DRILLING

6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.

7 THICKNESS OF OVERBURDEN: —

8 DEPTH DRILLED INTO ROCK: 144'

9 TOTAL DEPTH OF HOLE: 144'

10. SIZE AND TYPE OF BIT: NX

11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6111.0

12. MANUFACTURER'S DESIGNATION OF DRILL: STANWICK

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —

14. TOTAL NUMBER CORE BOXES: —

15. ELEVATION GROUND WATER: —

16. DATE HOLE: STARTED 17 NOV, 1989; COMPLETED 18 NOV, 1989

17. ELEVATION TOP OF HOLE: 6755

18. TOTAL CORE RECOVERY FOR BORING: — %

19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6111.0	0		SANDSTONE: WHITE AND RED, FINE TO COARSE GRAINED.			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
6069						
	40		MUDSTONE: DARK BROWN TO RED, SOFT, SANDY IN AREAS			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT: ABIQUIU DAM

HOLE NO 7+70

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6755 | Hole No @ 9+70 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (EP 1110-1-1801) GPO 1980 OF - 620 - 603

PROJECT: ABIQUIU DAM | HOLE NO 9+70 S ADIT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6755 | Hole No 7+70 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST | SHEET 5 OF 5 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO f	(Drilling ... weather...	REMARKS ... water loss, depth of ... etc., if significant) g
6723	110		MUDSTONE AS ABOVE				
	115		SANDSTONE: WHITE, RED AND BROWN, FINE GRAINED, 30% MUDSTONE				
	120						
	125						
	130						
	135						
	140						
6255							
	145		T.D.H.				
	150						

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1990 OF - 628-603

PROJECT ABIQUIU DAM | HOLE NO 7+70 S ADIT

Hole No. 8130 S ADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET / OF 3 SHEETS
	SWD	ALBUQUERQUE DISTRICT	

1. PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	SOUTH ADIT (#2)
3. DRILLING AGENCY	ALB. DIST.
4. HOLE NO. (As shown on drawing title and file number)	8130
5. NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	—
8. DEPTH DRILLED INTO ROCK	144'
9. TOTAL DEPTH OF HOLE	144'
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	6110.98
12. MANUFACTURER'S DESIGNATION OF DRILL	CP65
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — / UNDISTURBED —
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED 21 NOV, 1989 / COMPLETED 22 NOV, 1989
17. ELEVATION TOP OF HOLE	6255
18. TOTAL CORE RECOVERY FOR BORING	— %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6110.98	0		SANDSTONE: WHITE AND RED, FINE TO MEDIUM GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
6150						
	40		MUDSTONE DARK BROWN TO RED, SOFT, SANDY IN AREAS			
	45					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: ABIQUIU DAM

HOLE NO. 8130 S ADIT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 8130 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. S130 J ADT

PROJECT ABIQUIU DAM | INSTALLATION ALB DIST | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
6226	115		SANDSTONE: BROWN, RED AND WHITE, FINE GRAINED, 40% MUDSTONE			
	120					
	125					
	130					
	135					
	140					
6255						
	145		T.O.H			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF-620-603

PROJECT ABIQUIU DAM | HOLE NO S130 J ADT

Hole No 8+50 S Adit

DRILLING LOG

DIVISION	S.W.D
INSTALLATION	ALBUQUERQUE DISTRICT
SHEET	1 OF 3 SHEETS
1 PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	SOUTH ADIT (#2)
3 DRILLING AGENCY	ALB DIST.
4 HOLE NO. (As shown on drawing title and file number)	8+50
5 NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED _____ DEG FROM VERT.
7 THICKNESS OF OVERBURDEN	—
8. DEPTH DRILLED INTO ROCK	144'
9. TOTAL DEPTH OF HOLE	144'
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TUM or MSL)	6111.22
12 MANUFACTURER'S DESIGNATION OF DRILL	STANWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — UNDISTURBED —
14 TOTAL NUMBER CORE BOXES	—
15 ELEVATION GROUND WATER	—
DATE HOLE	STARTED 30 NOV. 1959 COMPLETED 2 DEC. 1959
17. ELEVATION TOP OF HOLE	6255
18 TOTAL CORE RECOVERY FOR BORING	— %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6111.22	0		SANDSTONE: RED AND WHITE FINE TO COARSE GRAINED			
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6153						
	45		MUDSTONE: DARK BROWN TO RED, SOFT, SANDY IN AREAS, GREEN SILTSTONE PRESENT IN SMALL AMOUNTS			
	50					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT Abiquiu Dam HOLE NO

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 5+52 S NO.1T

PROJECT: ABIQUIU DAM | INSTALLATION: ABQ. DIST. | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	15					
	80					
	85					
	90					
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 8150 S ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		MUDSTONE AS ABOVE			
6226	115		SANDSTONE: WHITE, BROWN AND RED, FINE GRAINED, 30% MUDSTONE			
	120					
	125					
	130					
	135					
	140					
6255						
	145		T.D.H.			
	150					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 620 - 603

PROJECT: ABIQUIU DAM | HOLE NO. 8150 S ADIT

Hole No. 0160 N. DRIFT

DRILLING LOG | DIVISION: S.W.D | INSTALLATION: ALBUQUERQUE DISTRICT | SHEET 1 OF 1 SHEETS

1 PROJECT	ADOBUIU DAM
2. LOCATION (Coordinates or Station)	NORTH DRIFT (H1)
3 DRILLING AGENCY	ALB. DIST
4. HOLE NO. (As shown on drawing title and file number)	0160
5. NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7 THICKNESS OF OVERBURDEN	—
8 DEPTH DRILLED INTO ROCK	58'
9. TOTAL DEPTH OF HOLE	58'
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (USM or MSL)	6091.9
12 MANUFACTURER'S DESIGNATION OF DRILL	INGERSOL RAND
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — / UNDISTURBED —
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 14 DEC, 1954 / COMPLETED 15 DEC, 1954
17. ELEVATION TOP OF HOLE	6150
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6091.9	0		SANDSTONE: WHITE, COARSE GRAINED.			
	5					
6101						
	10		MUDSTONE: DARK RED, SOFT			
	15					
	20					
6115						
	25		SANDSTONE: WHITE AND RED MEDIUM - COARSE GRAINED			
	30					
	35					
	40					
6136						
	45		MUDSTONE: DARK RED TO BROWN, SOFT.			
	50		T.O.H = (58') 6150			

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PROJECT: ADOBUIU DAM | HOLE NO

Hole No. 2100 N. DRIFT

DRILLING LOG

DIVISION: S.W.D.

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): NORTH DRIFT (N)
3. DRILLING AGENCY: ACE DIST
4. HOLE NO (As shown on drawing title and file number): 2100
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 162 ±
9. TOTAL DEPTH OF HOLE: 162 ±
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TUM or MSL): 6093.32
12. MANUFACTURER'S DESIGNATION OF DRILL: INGERSOL RAND
13. TOTAL NO OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED 31 DEC, 1989; COMPLETED 2 JAN, 1990
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6093.32	0					
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
6138	45		MUDSTONE: DARK RED TO BROWN, SOFT			
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT ABIQUIU DAM HOLE NO 2100 N DRIFT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No 2100 N DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: ACB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
6195			SANDSTONE: BROWN AND WHITE, 25% MUDSTONE.			
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 2100 N DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB WST | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	110		SANDSTONE AS ABOVE			
	115					
6210						
			MUDSTONE: DARK RED TO BROWN, SOFT, SANDY IN AREAS			
	120					
	125					
	130					
	135					
	140					
	145					
	150					
	155					
	160					
6155						
			T.D.H.			
	165					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 620 - 603

PROJECT: ABIQUIU Dam | HOLE NO 2100 N DRIFT

Hole No. 2+40 N DRIFT

DRILLING LOG	DIVISION: S W D.	INSTALLATION: ALBUQUERQUE DISTRICT	SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM	10. SIZE AND TYPE OF BIT: NX
2. LOCATION (Coordinates or Station): NORTH DRIFT (#1)	11. DATUM FOR ELEVATION SHOWN (TDM or MSL): 6093.92
3. DRILLING AGENCY: ALB. DIST.	12. MANUFACTURER'S DESIGNATION OF DRILL: INGERSOLL-RAND
4. HOLE NO. (As shown on drawing title and file number): 2+40	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
5. NAME OF DRILLER: CONTINENTAL DRILLING	14. TOTAL NUMBER CORE BOXES: —
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: —
7. THICKNESS OF OVERBURDEN: —	16. DATE HOLE: STARTED 3 JAN, 1990; COMPLETED 4 JAN, 1990
8. DEPTH DRILLED INTO ROCK: 161'	17. ELEVATION TOP OF HOLE: 6255
9. TOTAL DEPTH OF HOLE: 161'	18. TOTAL CORE RECOVERY FOR BORING: — %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6093.92	0		SANDSTONE: WHITE, COARSE GRAINED.			
6101	5					
	10		MUDSTONE: DARK RED, SOFT			
	15					
	20					
6116						
	25		SANDSTONE. WHITE AND RED, MEDIUM TO COARSE GRAINED			
	30					
	35					
	40					
6136						
	45		MUDSTONE, DARK RED TO BROWN, SOFT, SANDY IN AREAS			
	50					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No 2+40 N OFFT

PROJECT ABIQUIU DAM | INSTALLATION ALB 4ST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling ... water loss depth of weather ... etc if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
6196			SANDSTONE BROWN AND WHITE FINE GRAINED, 20% MUDSTONE			
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 628 - 603

PROJECT ABIQUIU DAM | HOLE NO 2+40 N OFFT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6755 | Hole No. 71+10 N DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	110		SANDSTONE AS ABOVE			
6710	115					
			SANDSTONE + MUDSTONE; 50% MS, 50% SS, brown			
	120					
	125					
	130					
	135					
	140					
	145					
	150					
	155					
6755	160					
			T.D.H.			
	165					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF-628 603

PROJECT: ABIQUIU DAM | HOLE NO 71+10 N DRIFT

Hole No. 3140 AT DRIFT

DRILLING LOG	DIVISION S.W.D	INSTALLATION ALBUQUERQUE DISTRICT	SHEET 1 OF 3 SHEETS

1 PROJECT: ABIQUIU DAM
2 LOCATION (Coordinates or Station): NORTH DRIFT (H)
3 DRILLING AGENCY: ALB. DIST
4 HOLE NO. (As shown on drawing title and file number): 3140
5 NAME OF DRILLER: CONTINENTAL DRILLING
6 DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7 THICKNESS OF OVERBURDEN: —
8 DEPTH DRILLED INTO ROCK: 160'
9 TOTAL DEPTH OF HOLE: 160'

10 SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (USM or MSL): 6095.4'2
12 MANUFACTURER'S DESIGNATION OF DRILL: INGERSOL RAND
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: --
15. ELEVATION GROUND WATER: --
16. DATE HOLE: STARTED 28 DEC, 1989; COMPLETED 30 DEC, 1989
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6095.4'2	0					NOTE LACK OF OBTAINED INFORMATION AFTER 60'.
	5					
	10					
	15					
	20					
	25					
	30					
	35					
	40					
	45					
	50					

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PROJECT: ABIQUIU DAM

HOLE NO. 3140

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 3+40 N DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50					
	55					
	60		MUDSTONE: DARK RED TO BROWN, SOFT, SANDY IN AREAS			
	65					
	70					
	75					
	80					
	85					
	90					
	95					
	100					
6197			SANDSTONE BROWN AND WHITE, FINE GRAINED, 20% MUDSTONE			
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 3140 N DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: AEC DIST | SHEET 5 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc.; if applicable) g
6208	110		SANDSTONE AS ABOVE			
	115		MUDSTONE / SANDSTONE 50% SANDSTONE, 50% MUDSTONE, BROWN			
	120					
	125					
	130					
	135					
	140					
	145					
	150					
	155					
6255	160		TD =			
	165					

ENG FORM 1836-A JUN 67 (ER 1110 1-1801) GPO 1980 O-620-603

PROJECT: ABIQUIU DAM | HOLE NO: 3140 N DRIFT

Hole No. 3+60 N DRIFT

DRILLING LOG | DIVISION: S.W.D | INSTALLATION: ALBUQUERQUE DISTRICT | SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): NORTH DRIFT (H1)
3. DRILLING AGENCY: ALB DIST.
4. HOLE NO. (As shown on drawing title and file number): 3+60
5. NAME OF DRILLER: CONTINENTAL DRILLERS.
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 160'
9. TOTAL DEPTH OF HOLE: 160'
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TUM or MSL): 6095
12. MANUFACTURER'S DESIGNATION OF DRILL: INGER SOL RAND
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED _____ UNDISTURBED _____
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED 3 JAN, 1990 COMPLETED 4 JAN. 1990
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING: —
19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6095	0		SANDSTONE: WHITE, COARSE GRAINED.			
6101	5					
	10		MUDSTONE: DARK RED, SOFT			
	15					
6117	20					
	25		SANDSTONE: WHITE AND RED, MEDIUM TO COARSE GRAINED			
	30					
	35					
6134	40					
	45		MUDSTONE: DARK RED TO BROWN, SOFT, SANDY IN AREAS			
	50					

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PROJECT ABIQUIU DAM | HOLE NO.

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 3+60 N. DRIFT

PROJECT ABIQUIU DAM | INSTALLATION ALB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
6196	100		SANDSTONE: WHITE AND BROWN, FINE GRAINED, 20% MUDSTONE			
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 628 - 603

PROJECT Abiquiu Dam | HOLE NO

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 3+60 N. DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: ACB DIST | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering etc. if significant) g
	110		SANDSTONE AS ABOVE			
6208						
			MUDSTONE AND SANDSTONE - NO DISTINCT SEPARATION.			
	115					
	120					
	125					
	130					
	135					
	140					
	145					
	150					
	155					
6255	160					
			T.O.H			

Hole No. 3+60 #5 N. DRIFT

DRILLING LOG

DIVISION: S.W.D

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): NORTH DRIFT (#1)
3. DRILLING AGENCY: ALB DIST
4. HOLE NO. (As shown on drawing title and file number): 3+60 #5
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☐ VERTICAL ☑ INCLINED 31 DEG FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 189'
9. TOTAL DEPTH OF HOLE: 189'
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6095
12. MANUFACTURER'S DESIGNATION OF DRILL: INGERSOL RAND
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED 2 JAN, 1990 COMPLETED 4 JAN, 1990
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6095	0					NOTE: ELEVATIONS CALCULATED USING ANGLE (CONVERTED TO VERTICAL MEASUREMENTS)
	5					
	10					
	15					
	20					NOTE: INCLINATION OBTAINED ONLY AFTER 1ST 35'
	25					
	30					
	35		SANDSTONE: WHITE, MEDIUM (PAINED)			
6136	40		MUDSTONE: DARK RED TO BROWN, SOFT			
	45					
	50					

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PROJECT: ABIQUIU DAM

HOLE NO.

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 3+60 #5 N DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: ACE DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
	95					
6195	100		SANDSTONE WHITE AND BROWN, FINE GRAINED, 20% MUDSTONE			
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 316C AS N DRIFT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DST | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		SANDSTONE AS ABOVE			
6208						
			SANDSTONE AND MUDSTONE, NO DISTINCT SEPARATION			
	115					
	120					
	125					
	130					
	135					
	140					
	145					
	150					
	155					
6255	160		T C M			
	165					
	170					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF 620 603

PROJECT: ABIQUIU DAM | HOLE NO 316C M - N DRIFT

Hole No. 2470 N ADIT

DRILLING LOG

DIVISION: S.W.D.

INSTALLATION: ALBUQUERQUE DISTRICT

SHEET 1 OF 1 SHEETS

1 PROJECT: ABIQUIU DAM

2 LOCATION (Coordinates or Station): NORTH ADIT (#1)

3. DRILLING AGENCY: ALB. DIST.

4 HOLE NO. (As shown on drawing title and file number): 2470

5. NAME OF DRILLER: CONTINENTAL DRILLING

6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN: —

8 DEPTH DRILLED INTO ROCK: 34'

9. TOTAL DEPTH OF HOLE: 34'

10. SIZE AND TYPE OF BIT: NX

11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6092.5

12. MANUFACTURER'S DESIGNATION OF DRILL: DODGE

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —

14 TOTAL NUMBER CORE BOXES: —

15. ELEVATION GROUND WATER: —

16. DATE HOLE: STARTED 29 DEC, 1959; COMPLETED 29 DEC, 1959

17. ELEVATION TOP OF HOLE: 6125

18 TOTAL CORE RECOVERY FOR BORING: %

19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6090.5	0		SANDSTONE: WHITE, COARSE GRAINED			
6112	10					
	15		MUDSTONE: DARK RED, SOFT.			
	20					
	25					
6122	30					
			SANDSTONE: WHITE, MEDIUM TO COARSE GRAINED			
6125	35		T O H			

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PROJECT: ABIQUIU DAM

HOLE NO

Hole No. 3150 N ADIT

DRILLING LOG | DIVISION: SWD | INSTALLATION: ALBUQUERQUE DISTRICT | SHEET 1 OF 1 SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): NORTH ADIT (N1)
3. DRILLING AGENCY: ALB. DIST.
4. HOLE NO. (As shown on drawing title and file number): 3150
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 60'
9. TOTAL DEPTH OF HOLE: 60'
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6090.4
12. MANUFACTURER'S DESIGNATION OF DRILL: DODGE
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER:
16. DATE HOLE: STARTED 18 DEC, 1959; COMPLETED 19 DEC, 1959
17. ELEVATION TOP OF HOLE: 6150
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6090.4	0		SANDSTONE: WHITE, COARSE GRAINED			
	5					
	10					
6104						
	15		MUDSTONE DARK RED, SOFT			
	20					
	25					
6120						
	30		SANDSTONE: WHITE, MEDIUM TO COARSE GRAINED			
	35					
	40					
	45					
6137						
	50		MUDSTONE: DARK RED TO REDISH SOFT T.D.H. 6150			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT | HOLE NO

Hole No. 4/10 N ADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET
	S.W.D.	ALBUQUERQUE DISTRICT	1 OF 1 SHEETS

1. PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	NORTH ADIT
3. DRILLING AGENCY	ALB. DIST
4. HOLE NO. (As shown on drawing title and file number)	4/10
5. NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	—
8. DEPTH DRILLED INTO ROCK	59 ±
9. TOTAL DEPTH OF HOLE	59 ±
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	6091.4
12. MANUFACTURER'S DESIGNATION OF DRILL	INGERSOL RAND
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — / UNDISTURBED
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 19 DEC, 1989 / COMPLETED 20 DEC, 1989
17. ELEVATION TOP OF HOLE	6156
18. TOTAL CORE RECOVERY FOR BORING	—— %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6091.4	0		SANDSTONE: WHITE, COARSE GRAINED			
	5					
	10					
6104						
	15		MUDSTONE: DARK RED, SOFT			
	20					
	25					
6118						
	30		SANDSTONE: WHITE AND BROWN, FINE TO MEDIUM GRAINED, 10-15% MUDSTONE			
	35					
	40					
6134						
	45		MUDSTONE: DARK RED TO BROWN, SOFT.			
	50		T.D.H. = 6150			

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PROJECT

HOLE NO

Hole No. 4170 N ADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS
	S.W.D	ALBUQUERQUE DISTRICT	

1. PROJECT	ABIQUIU DAM
2. LOCATION (Coordinates or Station)	NORTH ADIT (A1)
3. DRILLING AGENCY	ALB DIST.
4. HOLE NO. (As shown on drawing title and file number)	4170
5. NAME OF DRILLER	CONTINENTAL DRILLING
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	—
8. DEPTH DRILLED INTO ROCK	58'
9. TOTAL DEPTH OF HOLE	58'
10. SIZE AND TYPE OF BIT	NX
11. DATUM FOR ELEVATION SHOWN (TUM or MSL)	6092.4
12. MANUFACTURER'S DESIGNATION OF DRILL	STARWICK
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED — / UNDISTURBED —
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	—
16. DATE HOLE	STARTED 22 DEC, 1989 / COMPLETED 22 DEC, 1989
17. ELEVATION TOP OF HOLE	6150
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6092.4	0		SANDSTONE: WHITE, COARSE GRAINED			
6099	5					
	10		MUDSTONE: DARK RED, SOFT			
	15					
	20					
6118	25					
	30		SANDSTONE: WHITE AND BROWN, FINE TO MEDIUM GRAINED, 10-15% MUDSTONE			
	35					
	40					
6135	45		MUDSTONE: DARK RED TO BROWN, SOFT			
	50		TD H = 6150 (58')			

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PROJECT ABIQUIU DAM

HOLE NO 4170 N ADIT

Hole No 6+10 N ADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1
	SWD	ALBUQUERQUE DISTRICT	OF 2 SHEETS

1. PROJECT: ABIQUIU DAM	10. SIZE AND TYPE OF BIT: NX
2. LOCATION (Coordinates or Station): NORTH ADIT (H1)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6094
3. DRILLING AGENCY: ALB. DIST	12. MANUFACTURER'S DESIGNATION OF DRILL: DODGE
4. HOLE NO (As shown on drawing title and title number): 6+10	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — UNDISTURBED —
5. NAME OF DRILLER: CONTINENTAL DRILLING	14. TOTAL NUMBER CORE BOXES: —
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: —
7. THICKNESS OF OVERBURDEN: —	16. DATE HOLE: STARTED 9 JAN, 1990 COMPLETED 9 JAN, 1990
8. DEPTH DRILLED INTO ROCK: 101'	17. ELEVATION TOP OF HOLE: 6095
9. TOTAL DEPTH OF HOLE: 101'	18. TOTAL CORE RECOVERY FOR BORING: — %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6094	0		SANDSTONE! WHITE, COARSE GRAINED			
6100	5					
	10		MUDSTONE! DARK RED, SOFT			
	15					
	20					
6116						
	25		SANDSTONE! WHITE AND BROWN, FINE TO MEDIUM GRAINED, 20% MUDSTONE			
	30					
	35					
6132						
	40		MUDSTONE! DARK RED & BROWN SANDY THROUGHOUT.			
	45					
	50					

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PROJECT: ABIQUIU DAM

HOLE NO: 6+10

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6195 | Hole No. L11C N ADIT

PROJECT: ABIQUIU Dam | INSTALLATION: AZB DIST. | SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc. if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
6177						
	85		SANDSTONE · F. TO MEDIUM GRAINED, BROWN, 40% MUDSTONE			Caving noted hot, continued throughout length of hole
	90					
	95					
	100					
6195						
			T.D. 100'			
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) OBSOLETE OF 620 103

PROJECT: ABIQUIU Dam | HOLE NO. [illegible]

Hole No. 8+50 N.ADIT

DRILLING LOG	DIVISION S.W.D.	INSTALLATION ALBUQUERQUE DISTRICT	SHEET 1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): NORTH ADIT (#1)
3. DRILLING AGENCY: ALB. DIST.
4. HOLE NO. (As shown on drawing title and file number): 8+50
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 159'
9. TOTAL DEPTH OF HOLE: 159'
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TUM or MSL): 6096.3
12. MANUFACTURER'S DESIGNATION OF DRILL: CP65
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED 17 JAN, 1990 COMPLETED 18 JAN, 1990
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6096.3	0					NOTE: INFORMATION OBTAINED ONLY AFTER 33'.
	5					
	10					
	15					
	20					
	25					
	30					
	35					
6137	40		MUDSTONE: DARK RED TO BROWN, SOFT			
	45					
	50					

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TRANSMITTED

PROJECT: ABIQUIU DAM HOLE NO. 8+50 N.ADIT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 8150 N ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DST. | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
6189			SANDSTONE: BROWN AND WHITE, 10% MUDSTONE			
	95					
	100					
	105					
	110					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6255 | Hole No. 8157 N. ADIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB. DIST. | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6209	110		SANDSTONE AS ABOVE			
6215	115		MUDSTONE: DARK RED, SOFT			
6228	120		SANDSTONE: WHITE AND BROWN, FINE GRAINED			
	125					
	130					
	135		SANDSTONE + MUDSTONE.			
	140					
	145					
	150					
	155					
6255	160		T.D. M			

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF 520-603

PROJECT: ABIQUIU DAM | HOLE NO. 8157 N. ADIT

Hole No. 9+54 #3 N ADIT

DRILLING LOG	DIVISION	INSTALLATION	SHEET
	S.W.D	ALBUQUERQUE DISTRICT	1 OF 3 SHEETS

1. PROJECT: ABIQUIU DAM	10. SIZE AND TYPE OF BIT: NX
2. LOCATION (Coordinates or Station): NORTH ADIT (#1)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): 6097
3. DRILLING AGENCY: ALB. DIST.	12. MANUFACTURER'S DESIGNATION OF DRILL: INGERSOL RAND
4. HOLE NO. (As shown on drawing title and file number): 9+54 #3	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED — UNDISTURBED —
5. NAME OF DRILLER: CONTINENTAL DRILLING	14. TOTAL NUMBER CORE BOXES —
6. DIRECTION OF HOLE: ☐ VERTICAL ☑ INCLINED 30° DEG. FROM VERT.	15. ELEVATION GROUND WATER —
7. THICKNESS OF OVERBURDEN —	16. DATE HOLE: STARTED 15 DEC, 1959 COMPLETED 16 DEC, 1959
8. DEPTH DRILLED INTO ROCK 173' (163' VERT)	17. ELEVATION TOP OF HOLE 6260
9. TOTAL DEPTH OF HOLE 173' (163' VERT)	18. TOTAL CORE RECOVERY FOR BORING — %
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6097	0		SANDSTONE: WHITE COARSE GRAINED			
6100						
			MUDSTONE: DARK RED, SOFT			
	5					
	10					
	15					
6115						NOTE ELEVATIONS CALCULATED USING ANGLE CONVERTED TO VERTICAL DISTANCES
	20		SANDSTONE: WHITE AND RED, MEDIUM TO COARSE GRAINED			
	25					
	30					
	35					
6131	40					
			MUDSTONE. DARK RED TO BROWN, SOFT			
	45					
	50					

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PROJECT: ABIQUIU DAM

HOLE NO: 9+54 #3 N ADIT

TRANSLUCENT

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6260 | Hole No. 1154 (3 N 10)

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	60		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
6184	90					
			SANDSTONE, BROWN AND WHITE, 10% MUDSTONE			
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 628 603

PROJECT: ABIQUIU DAM | HOLE NO

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6260 | Hole No. 9154 N3 N HDT

PROJECT: ABIQUIU DAM | INSTALLATION: AEB DIST | SHEET 3 OF 5 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering etc. if significant) g
	110		SANDSTONE AS ABOVE			
	115					
6216						
	120		MUDSTONE / SANDSTONE: BROWN 50% MUDSTONE, 50% SANDSTONE			
	125					
	130					
	135					
	140					
	145					
	150					
	155					
	160					
6260						
			TD H.			

Hole No. 10+80 #5 IN ADIT

DRILLING LOG | DIVISION: S.W.D. | INSTALLATION: ALBUQUERQUE DISTRICT | SHEET 1 OF SHEETS

1. PROJECT: ABIQUIU DAM
2. LOCATION (Coordinates or Station): NORTH ADIT
3. DRILLING AGENCY: ALB. DIST.
4. HOLE NO. (As shown on drawing title and file number): 10+80 #5
5. NAME OF DRILLER: CONTINENTAL DRILLING
6. DIRECTION OF HOLE: ☐ VERTICAL ☑ INCLINED 32 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: —
8. DEPTH DRILLED INTO ROCK: 185± (157° VERTICALLY)
9. TOTAL DEPTH OF HOLE: 185± (157° VERTICALLY)
10. SIZE AND TYPE OF BIT: NX
11. DATUM FOR ELEVATION SHOWN (TUM or MSL): 6098
12. MANUFACTURER'S DESIGNATION OF DRILL: INGERSOL RAND
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED —; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: —
16. DATE HOLE: STARTED 10 JAN, 1990; COMPLETED 11 JAN, 1990
17. ELEVATION TOP OF HOLE: 6255
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
6098	0		SANDSTONE: WHITE, COARSE GRAINED			
	5		MUDSTONE: DARK RED, SOFT			
	10					
6114	15					
	20		SANDSTONE: WHITE AND RED, MEDIUM TO COARSE GRAINED			NOTE ALL ELEVATIONS COMPUTED TO VERTICAL USING ANGLE
	25					
	30					
	35					
6135	40		MUDSTONE: DARK RED TO BROWN, SOFT			
	45					
	50					

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PROJECT: ABIQUIU DAM | HOLE NO.

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE 6260		Hole No. [illegible]
PROJECT ABIQUIU DAM	INSTALLATION ALB. DIST		SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		MUDSTONE AS ABOVE			
	55					
	60					
	65					
	70					
	75					
	80					
	85					
	90					
6169			SANDSTONE: BROWN AND WHITE, FINE GRAINED, 10% MUDSTONE			
	95					
	100					
	105					
	110					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF-620-603

PROJECT ABIQUIU DAM

HOLE NO [illegible]

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE 6235 | Hole No. 10180 #5 N ABIT

PROJECT: ABIQUIU DAM | INSTALLATION: ALB DIST. | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	110		SANDSTONE AS ABOVE			
6210						
			MUDSTONE: DARK RED, SOFT			
	115					
6215						
			SANDSTONE WHITE AND BROWN, FINE GRAINED.			
	120					
	125					
6228	130					
			SANDSTONE / MUDSTONE NO DISTINCT SEPARATION, BROWN, FINE GRAINED			
	135					
	140					
	145					
	150					
	155					
6235						
			T D H			
	160					

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1969 OF - 620 - 603

PROJECT: ABIQUIU DAM | HOLE NO: #5, N AB